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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

JAMES W. WHITE, M.D., D.D.S.

Observe, Compare, Reflect, Record.

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THE

DENTAL COSMOS.

VOL. XVII. PHILADELPHIA, JANUARY, 1875. No. 1.

ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S.,
in the Office of the Librarian of Congress at Washington.]

(Continued from page 627 of vol. xvi.)

It is found, however, that instances occur in which even the combination of dryness and systematic rapid cutting with sharp excavators cannot be tolerated, and thus we have—

2d. *Topical applications for obtunding sensitive dentine.* The considerations pertaining to these entail upon us the necessity for dividing these applications into four classes. *First,*—those which do not endanger the vitality of the dental pulp. *Second,*—those which may possibly endanger the pulp. *Third,*—those which are liable to produce this result. *Fourth,*—those which are dangerous in this particular.

First,—Those which do not endanger the vitality of the dental pulp. The first application in the grade of benignity for the alleviation of sensitive dentine, is prepared chalk. This material is particularly applicable to large cavities of decay, truly "deep-seated" (approaching the pulp-cavity), and is used in this form rather than in that of precipitated chalk, from its greater facility of manipulation; it is also even more decidedly applicable to such large, deep cavities, so situated as to render it difficult that they shall be kept dry, for *moisture is a necessary adjunct* in the use of chalk for this purpose,—thus, while it is requisite that the chalk should be moistened after it is packed in cavities which are protected from the ingress of saliva, it is fortunately nicely adapted to such cases as have been indicated. The reason for this necessity for moisture is the fact that with the complete dryness possible to attain in most cavities, together with the dryness of the prepared chalk, but tardy progress could be made in the production of that neutral condition of tissue which is best calculated to insure comfort during operating; while that degree of moisture which facilitates such action is naturally productive of much more promptly satisfactory results. Tepid water is, therefore, to be employed, by the drop, for this purpose, while the saliva is *accepted* when it cannot be rejected.

It is oftentimes surprising to note the almost immediate cessation of that uneasiness which has been mentioned as one of the symptoms of sensitive dentine (when such exists), as the result of this chalk application; and although the obtunding of the sensitiveness of the dentine is, of course, a work of much slower progress, yet the employment of the hour, or even of the day or two, which is sometimes required to permit the operation of excavating with the desired immunity from pain, is frequently the *very best use of the time and trouble* which could be made *for these teeth.*

It must be remembered, that, just in proportion to the mildness of *sufficient* medication, is the perfection of satisfaction in result, and thus it is that I feel desirous of impressing the conviction that success with a gentle remedy is an achievement well worthy of attainment.

The second application, of increased power, is the *bicarbonate of soda.*

This is employed in precisely the same kind of cavities as is the prepared chalk; it is used in the same manner; moisture is likewise a necessity for the successful prosecution of its work, and it is regarded as a perfectly safe agent so far as the pulp is concerned. It is more *decidedly* an alkali, and it is therefore employed when, from want of time, or from impossibility of lengthy maintenance of the remedy within the cavity, an application of more prompt action is desirable.

The third remedy is strong solution of ammonia (*liquor ammoniæ fortior*).

Unlike the two previously mentioned alkaline remedies, this one is efficacious just in proportion to the maintained dryness of the cavity and the *strength of the medicament.* From considerations pertaining to the first of these conditions, it will be found that liquor ammoniæ fortior is peculiarly applicable to cavities in incisors, cuspids, and perhaps bicuspids, where soft dentine is found associated with hard enamel, and where the comparatively small *quantity* of tissue intervening between the interior of the cavity of decay and the exterior of the pulp-cavity compels the most careful treatment in view of possible pulp irritation.

In these cases it should be remembered that the remedy may irritate thermally, and that a full drop might cause much pain from its coldness; it is therefore applied to the thoroughly dried dentine in the quantity of a portion of a drop at a time, from a small probe or excavator; thus, by repetition, sufficiently saturating the dentine without shock to the pulp.

In regard to the *strength* of the medicament, it will be necessary to be quite observant, never depending upon even its freshness from the drug store without testing its power by *carefully* smelling it.

It should be truly "fortior," and this should also be remembered in bringing it under the nose of the patient during its passage to the cavity of decay.

The eyes and nostrils of the patient should be guarded, and the remedy cautiously introduced into the mouth, unless amply secured by rubber dam against any possible irritation of the throat or lungs.

These latter considerations make this application an objectionable one in cases where ophthalmic, nasal, laryngeal, bronchial, or pulmonary irritability is markedly pronounced.

The fourth remedy is *nitric acid.* It might seem questionable to class so powerful an agent as this with those which do not endanger the pulp, but the reason for this will be apparent when I state that its employment is recommended only in cavities which are superficial, in teeth of great density and exquisite sensibility, and in such cases of sensitive dentine upon the worn articulating faces of teeth as are presented *without cavities*, and for these only in such cases as have proved unamenable to ordinary treatment.

After thoroughly drying the tooth, and so arranging with napkins, or preferably, with the rubber dam, as to preclude the ingress of moisture, the nitric acid is applied in very small quantity, and with exact precision, upon the sensitive spot, by means of a piece of small-sized gold wire. The application should be accurately circumscribed, and its effect in progress carefully ascertained at intervals of a *few seconds*' duration.

This is done by neutralizing the acid by the employment of a small quantity of bicarbonate of soda, and, having thus rendered it inert, cleansing the cavity or surface by means of the usual paper, muslin, or other material used for this purpose, and testing, for sensation, with an excavator.

It is sometimes found that a sufficient decomposition of dentine has taken place to have commenced the formation of a cavity; this, so far from being detrimental, I have frequently found of decided advantage, for through the attainment of this result, it has been a work of comparative ease, to both patient and operator, to complete an excavation sufficient for the retention of a surface filling, and thus a tolerably durable exemption from suffering has been obtained.

I qualify the durability, even of this operation, in such cases as enforce the acid applications for the relief of sensitive dentine, from the fact that after the lapse of some months, or, at best, a year or two, my experience has been, that either a spot contiguous to the filling, or at the edge of the artificial cavity, becomes tender, and gives rise to all the troubles from touch, from contact in eating, and from sympathetic irritation, that were found to exist previously.

In such cases a repetition of the former treatment is not necessarily demanded, nor should it be indulged in until all other usual applications have been found to be unavailing.

It is also the knowledge of the likelihood of this occurrence that suggests at the termination of the first excavation, and prior to the introduction of the filling, the removal of all trace of acid, by the use of strong solution of ammonia or moistened bicarbonate of soda, and after drying the cavity, that its walls should be saturated with creasote or carbolic acid, with the view to utilize their antiseptic power.

The fifth remedy is *oil of cloves*. I have already alluded to the efficacy of this medicament as a topical application for the relief of pain, but it is *not* that *prompt* agent in connection with sensitive dentine that it is in punctures, stings, itchings, etc., and in irritation of the dental pulp, from complete or almost complete exposure.

Its action is rather like that of chalk; slowly, gently, and soothingly reducing excess of sensibility.

It requires, therefore, *time*, in which to do its work, and is especially applicable in cases of very soft dentine, in very deep-seated cavities of decay, particularly where these occur *between teeth*, and where some separation of teeth is judged desirable, or where gum tissue is to be crowded out prior to operating.

In these cases, its application upon pellets of cotton wool, introduced into the cavity with greater or less pressure, as is permissible, will be found markedly advantageous, and it can be relied upon as *safe*, for *never*, so far as my experience teaches, is it irritating in the least degree to the critically situated pulp.

It is usually the case that daily applications are productive of the best results, each application permitting the removal of *some* decayed dentine, and thus being productive of an advance of one step on the road towards final satisfactory completion of the operation.

It is not, however, necessary that the patient should be seen every day, as the insolubility of the oil in the fluids of the mouth enables it to hold in abeyance the tendency towards sensibility for two, or three, or even more days.

While the oil of cloves possesses less power as an antiseptic, and possibly as a pain obtunder, than creasote or carbolic acid, it will nevertheless be recognized as having advantages over these remedies in its agreeable odor and taste, and that, although it is very pungently warm in the mouth, and should therefore be used carefully and in small quantity, it is nevertheless *not an escharotic*, and its overflow will therefore *not burn* the mucous membrane, the tongue, the lips, corners of the mouth, and cheeks.

Second,—Those which may possibly endanger the pulp.

The first of these remedies is *creasote* (carbolic acid?),—and I wish to be understood as referring only to those products of an *oily appearance* and *marked insolubility in water*, which are sold at present under this name.

There has been, for the past few years, much discussion as to the relative value of the present creasote of commerce and the "old-fashioned wood creasote."

After careful experimentation during a period of eight years, I concluded that the results obtained were not sufficiently varied to warrant the adoption of either to the exclusion of the other upon the basis of superiority as a medicament. I have, therefore, so far discarded the "old wood creasote," as not to have used it for several years; but I did this solely on account of its excessively disagreeable and persistent odor. I found no compensating advantage from its use, with, perhaps, a few exceptional instances, and, considering the characteristic of a minimum of odor in combination with equality of usefulness to be decidedly advantageous, I have adopted the "creasote" (carbolic acid) of E. Merck, of Darmstadt, Germany, as being an efficacious, and, at the same time, agreeable product.

The comparatively slight odor which pertains to it is rendered even less by permitting the bottle containing it to remain always unstopped, and this result seems, experimentally, to be not perceptibly detrimental.

(To be continued.)

UNDERLYING CAUSES OF THE DECAY OF TEETH.

BY GEO. W. FIELD, D.D.S., GENEVA, SWITZERLAND.

(Read before the American Dental Society of Europe, July 2, 1874.)

I PROPOSE to state as briefly as possible no new hypothesis of the cause of caries, but simply my views and belief on the subject under discussion. A tooth is composed of enamel, dentine, and cementum. The first being the hardest, and covering the body of the tooth, serves, or should serve, as a protection against external injuries, or injurious agents of whatever kind, to which it may be exposed. I believe that teeth normally developed are capable of a remarkable degree of resistance to all ordinary deleterious agents to which they are exposed. Still, notwithstanding this normal resistant force or power, we find "dental caries" to be our bane.

On page 284 of the DENTAL COSMOS (1874) Dr. J. Foster Flagg gives a good division or classification of the different tooth-structures. Two of his divisions will suffice: "1st. Teeth of firm, dense structure, yellowish in color, having exceedingly hard, but not unduly polished enamel, and so little predisposed to decay as usually to remain sound throughout a long life." "4th. As soft of structure as those of the first are dense; they are as opaque and weak-looking as their opposites are clear and strong." Now, why this contrast? Why are not all equally liable to caries? Why is one better able to resist the same deteriorating influences so fatal to the other? Is the cause chemical, vital, chemico-vital, electro-voltaic action, leptothrix, or mal-nutrition?

What have the most careful observers yet brought out? That the leptothrix is the cause of caries? No. It is true that the parasite is always found where decay is; also, where the sulci are very deep, there it takes up its abode. When decalcification has already commenced, there it may be found; in short, wherever the integrity of the tooth-substance is compromised in the least, the leptothrix will be found, and, like other parasites, thrives best where dissolution reigns, and doubtless hastens the disintegration of that to which it attaches itself. But it is worthy of remark, that though always present in the saliva, it never attaches itself, except to tooth-substance which has been already robbed of its normal resistive power, if ever possessed of it.

As to the vital theory, I can understand nothing of it, as there seems to be nothing demonstrable in that direction.

Let us now consider what part chemical action may or may not play in producing decay of the teeth.

Acids are always present where we find caries; and it seems that without the presence of these destroying agents we would have no caries, and Othello's occupation would be gone. You will say that the fluids of the mouth do not always give acid reaction. Admitted. But put your piece of litmus-paper in a crevice or deep sulcus, or near the free margin of the gum, and what is the result? Acid reaction. At these points, in the great majority of cases, the tooth is first attacked. Experiments by such men as Wedl, Leber and Rottenstein, and Magitot, have proved that acids in weak solution will affect the teeth and dissolve out the lime salts. Mr. Tomes, in quoting from M. Magitot, says, "With sugar, the naked-eye appearance of caries was exactly imitated; and the destruction was far greater in a solution to which a fragment of animal matter had been added, than in the pure sugar solution." We may learn from this experiment how sugar may produce caries. It is not so much by its direct action, as by the action of the products of fermentation. In the mouth the conditions and agents essential to this chemical change are present; fluids, for solution; interstices and sulci for its reception and retention; the animal matter always supplied; and a sufficient degree of warmth to insure rapid action. Query:—Will not the frequent use of the brush and toothpick tend to defeat all this?

The acids most frequently found in the mouth, either as products of fermentation, or from regurgitation, or as contained in fruits, are lactic, butyric, citric, and malic; some of these may be found in nearly every mouth, and, from experiments many times repeated by different investigators, it seems to me there can be no doubt that they are the prime local causes of this decalcification, breaking down, and wasting away of the tooth-substance denominated "dental caries." I say this is the local cause; but I believe there is another cause, without which these previously-named agents could not do their work so rapidly and so effectively. We have already remarked that tooth-substance in its normal state, *i.e.*, properly developed, possesses great resistive force, even to the action of the deleterious substances found in the mouth. One may easily find mouths innocent of the tooth-brush, and to whom a toothpick would be an innovation never dreamed of. Here you will find acid reaction between the molars and bicuspids; and yet the teeth even at these points bear but slight, perhaps no evidence of decay; yet these same individuals indulge in sweets, fruits, and perhaps are not free from acid eructations. Under these seemingly favorable conditions for caries, how can we account for this exemption? The enamel, the cementum, and in some cases the dentine, are exposed, but free from decay. In contrast to this is a case where we find almost every tooth decayed, and many already lost. This individual is one who has always made good use of the prescribed means for maintaining a cleanly condition of mouth and teeth; but notwithstanding all his and your well-directed efforts to stay the progress of this pathological condition of the teeth, you have the discouragement of seeing them crumble and waste away; and caries is triumphant over both therapeutical and surgical skill. Many times, also, your patient, unless properly instructed by you, attributes all to your lack of skill. This imputation, to a conscientious man, practicing his profession intelligently, is "the last straw." Those possessing the teeth of the first class are found to be of the English, Irish (north), and Scotch. I have not yet found among them one of the second class, except it was a cachectic subject. The Scotch teeth are superior to all others; they have an enamel like adamant, and the preparation of the cavities, when there are any, is very much like labor. We have spoken of the resistive quality of normal dental tissue. Now, we know the tooth-substance is composed of organic and inorganic matter. The organic, or animal matter, is estimated at about 3½ per cent. in the enamel, and 28¾ per cent. in the dentine; whereas the inorganic, or earthy matter, is estimated at about 96½ per cent. in the enamel, and 71⅓ per cent. in the dentine. The inorganic matter is composed mainly of phosphate of lime; and it is to this, and to its attendant elements, that the dentine is indebted for its density, and the enamel for its adamantine nature. It is this great predominance of the inorganic over the organic elements that endows the normal tooth with that power of resistance to the deleterious agents by which it is almost constantly surrounded. By analysis, healthy blood is found to contain a small percentage of inorganic matter, and we can but infer that it is there for a purpose, and that purpose the building up and supporting a perfect osseous system, and that it is from this source alone that the teeth can derive the materials essential to the proper development of their different parts. The blood, acting as medium to supply these materials, cannot manufacture them, but must be supplied most generously, and the food taken into the system must be the base for supplies. Then it follows that the food richest in phosphates is what we need. In the preparation of wheat flour, the most valuable part is rejected,—that which contains the very nutriment for the want of which we are losing our teeth. The animals fare better than we. The Scotch oatmeal is still richer in phosphates than wheat, be the latter ever so properly prepared; therefore, to substitute this for the fine white wheat flour is what is essential if we wish to have such teeth as nature designed we should. These are my convictions, and they are strengthened daily.

I have had opportunity to examine the mouths of people of almost every nationality, and I have found none that could be compared with those from the north of Ireland and of Scotland. These people make use of oatmeal as a principal article of food. They tell me that it is an almost universal breakfast dish, in the form of porridge, with milk; especially for the young. In many families it is served in cake form for supper. This is a national dish. All partake of it, old and young; and it is with the latter, during the period when all the developmental forces are active, that the system thus nourished is the most benefited. These people not only have a good dental development, but they are strong and healthy, possessing a strength and vigor of constitution almost unknown elsewhere. Acknowledge that nature must find in the food the material out of which to build up a strong and vigorous constitution; how can we expect to have teeth other than of the delicate, fragile sort, easily acted upon by the deleterious agents present in the mouth, if we persist in withholding the very elements required for their proper nourishment and development?

We all know that, during the period of growth and development, if there is an unusual deficiency of the bone-producing elements, if, because of a severe illness, there is a suspension or a weakening of the assimilative power of the system, this temporary arrest of the developing process in growth leaves its ineffaceable mark, and nowhere so conspicuously as upon the teeth. This being the case, is it unreasonable to suppose that, given the ordinarily good health and activity of the developmental forces of children, and a generous supply of the proper bone food, we will have as a result a good dental development?

Will teeth of this class be found to be less liable to decay than those of the fourth class described by Flagg? Yes; otherwise my argument is in vain. I have seen individuals who in their youth enjoyed a fair modicum of health, the developmental forces were in healthful activity, the food-supply was of the character and quality we claim to be essential to the building up of a sound organization, and nature, in this her normal condition, has produced what might with truth have been called a perfect dental structure. These cases, at an advanced age, have come under my notice; they have been the victims of disease, some of them for many years under medical treatment; but these normally developed teeth bear but slight indications of caries, notwithstanding the deranged state of the whole system, the acidity of the fluids of the mouth, and the results of fermentation. Is this because the destructive agents are in such weak solution that any tooth-substance could resist their action? or is it not rather that aided nature has done her work so well, because so naturally, that it is, as was intended, proof against any attack from without? In view of these facts, as presented, I can arrive at no other conclusion than this,—the principal "cause underlying the decay of teeth," is mal-nutrition during the formative period.

PROCEEDINGS OF DENTAL SOCIETIES.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

An adjourned annual meeting of the association was held on Tuesday evening, November 17th, 1874, at which an election for officers to serve the ensuing year was held, with the following result:

President.—Dr. Spencer Roberts.

Vice-President.—Dr. J. H. Githens.

Recording Secretary.—Dr. Joseph Pettit.

Corresponding Secretary.—Dr. W. H. Trueman.

Treasurer.—Dr. E. R. Pettit.

Librarian.—Dr. Robert Huey.

Committee on Membership.—Drs. Adams, Wert, and James Truman.

After the transaction of other business, "Celluloid as a Base for Artificial Teeth" was discussed as follows:

Prof. Truman. There are many things connected with this subject that seem to require explanation. There are times when, with all the care possible, and with a close adherence to the rules given, misfits are the result. This must be occasioned by forcing the plaster out of position. I have had recently several cases that gave much trouble from this cause, and also from the breaking of blocks. As plaster seems to be very unreliable, why can we not use metal? I can see no objection, except an increased danger to the blocks. The different experiences had in the use of this material indicate that there must be a right way to use it and a wrong way. I imagine that some of us have fallen, at times, into the latter.

Prof. Buckingham. I have not experienced any of this trouble, and can do anything with it that I can do with rubber; do not find that the blocks are more apt to break than with rubber, and think it takes the impression of the cast as well.

I have used glycerin, and in some cases think the quantity used has been insufficient, as, when the thermometer indicated 290°, I have been able to bear my finger on the upper part of the flask.

By using more glycerin, we get the flask heated more uniformly throughout.

The flask should be brought together slowly, a little more force being required toward the end. I have used it successfully for repairing—had one under-set on silver, where five anterior teeth were broken off, and attached them with celluloid. Have used it on gold, silver, and Weston's metal with success. I think it is infinitely better than rubber in finish and appearance, and it will fit equally well. It makes a good gum, and has the advantage over rubber of being worked in connection with silver.

Prof. Truman. I have one thing to say in its favor that cannot be said of rubber,—it does not irritate the mucous membrane of the mouth, or at least I have not discovered any such result. In a case recently, where the patient had been wearing a rubber plate, the mouth and throat exhibited a very irritated condition. The patient had been under medical treatment for some months. I advised an immediate change, and suggested celluloid. The adoption of this entirely reduced the inflammation, and restored the parts to a healthy condition in a few days.

In answer to an objection that the plates ultimately softened and the teeth came off, Prof. Buckingham said: I think one difficulty formerly was that the camphor was not sufficiently gotten rid of in the manufacture.

Camphor will soften the material, and this free camphor present will explain the cause of the softening of some plates. I believe I can do *more* with it than with rubber. Have united pieces perfectly, so that the joint was not perceptible, and have made a plate out of scraps, which the lady is wearing yet. A hole may be mended by softening the surrounding parts with spirits of camphor, putting on a new piece, and working the case over again. I have mixed it with corundum, and, having placed it in the sun to evaporate the camphor, made good wheels of it. Have not had a single failure from warping, and whenever there has been a misfit, the fault has been my own.

Prof. Wildman. To prevent the plaster giving way, it must set very hard; mixing as thick as is practicable conduces to this result. The addition of a little hydraulic cement has been recommended. As yet, I have had no trouble with the plaster breaking. There has been a great difference in the various lots of celluloid, there having been great improvements made in it. That produced formerly would warp, but the difference between that and the recent production is caused principally by the difference in manipulation in its manufacture, the composition being nearly the same as formerly. A lot is at present in process of manufacture that will be superior in color to that now in the market. I consider the steam apparatus preferable, because with it we get a more uniform heat, and it can be heated more quickly. Volatilization takes place in the use of glycerin, which affects the heat to some extent.

Dr. Tompkins. My experience, though limited, is favorable to the use of celluloid. I have mounted several sets of teeth with satisfactory results, and am led to believe that, in durability and exact adaptation, it possesses all the essential qualities required for dental purposes. The color, lightness, and the improvement given to the appearance of the teeth after they are mounted, leads the patient to decide at once in its favor. I have not, as yet, found any shrinkage in the plates now manufactured, some of which were taken from the flask while yet warm, nor have I had any complaints from the taste of camphor. The material runs into every interstice that exists about the teeth, is close around the pins, and strongly attaches the teeth to the base. The process of repairing is less tedious than with rubber, and there is no line of division to distinguish the old from the new material, the color being the same. Have only had difficulty in one instance, while endeavoring to mount two front blocks on an old plate. At the suggestion of Prof. Buckingham, used spirits of camphor in the process, and was successful.

In adaptation, it is equal to rubber; the plates fit as well, and, thus far, without any of the irritating effects upon the gums which are often seen from wearing rubber plates. It requires very little experience in its manipulation, a careful observance of the printed instructions being all that is necessary. I am satisfied that if dentists once become accustomed to its use, as they have with rubber, they will consider it more desirable in every respect.

Dr. Spencer Roberts. I have had no failures in the use of celluloid. Thought, at first, that we would have to use plain teeth, but upon further experience, find I can also use gum teeth to advantage. It is stronger than rubber, consequently there is seldom any breakage. Had one temporary case, that was worn two years, and have replaced it with a permanent set. The patient would not have anything else.

I work it in glycerin, and would not use rubber if they would give me the patent.

Prof. Wildman. The flask should be filled as with rubber; but instead of cutting gates running from the case to the circumference of the flask, cut a groove (of sufficient size to contain the excess of material) around the case, leaving about one-eighth ($\frac{1}{8}$) of an inch of plaster intact, the object being to keep it under pressure. I have put in many cases, and have not used rubber for a long time. Have heard from only one case that was not satisfactory, and that one was made for a lady who was old and enfeebled, and the length of the teeth (necessary for proper articulation) annoyed her. Not wishing to destroy the symmetry of the teeth by grinding off the points, I took them from the plate, ground off the bases, and worked the case over again, and have not heard from it since, which is pretty good evidence that it is all right.

In the oil apparatus, after the sections of the flask are brought together, the heat should be run up to 290°, as there is then less liability to warp. Mr. Hyatt recommends the temperature being brought down to 200°, and afterwards held at 160° for some time. Celluloid does not flow readily, and we must wait until the disk is *softened throughout;* then upon applying pressure there is little or no danger of breaking the plaster. I have been annoyed by the appearance of a crack around the chamber, which, I think, arises from the center of the disk being too thin, the surplus flowing in and causing it. I am informed that the molds are now being altered to remedy this defect. I consider the recently-published rules for working celluloid sufficiently explicit and correct to enable any dentist who adheres to them to manipulate it successfully. I feel hopeful that it may supersede rubber.

Prof. Wildman exhibited specimens of celluloid in the different stages of manufacture, and showed a case that had been worn as a temporary set for thirteen months. There was no giving nor yielding, except a slight abrasion back of the anterior teeth, caused by the irregular inferior central incisors coming in contact with this part of the plate.

Other specimen cases were shown by the members present, and great interest was manifested in the proceedings.

JOSEPH PETTIT, *Secretary.*

FIRST DISTRICT DENTAL SOCIETY OF NEW YORK.

REPORTED BY FRANK M. ODELL, D.D.S.

AT the regular monthly meeting of the society, held at the house of the president, Dr. R. M. Gage, Oct. 6th, 1874, the subject for discussion was, "The Relative Merits of Celluloid and Rubber as a Base for Artificial Teeth."

Mr. I. Smith Hyatt, who was present, responded to an invitation to give his views in relation to celluloid, by saying: that the early objections to celluloid have now been overcome, by substituting hemp for cotton, and having the hemp prepared for the action of the solvent by first making it into thin tissue-paper sheets, of a uniform thickness, in order that the solvent may readily act upon all portions of the hemp simultaneously and uniformly, thereby obtaining a uniform product, able to withstand the action of moisture and the acids of the mouth, and which will not discolor or disintegrate in the mouth, as was the case with some of the first lots put into the market.

Celluloid, as at present made, resists the action of acids as well as rubber does. In order to succeed in the use of it, you must learn how to operate it. Use the steamer, in packing, instead of oil, as formerly, and heat to 230° or 240° before commencing to bring the flask together, and exerting just force enough to confine the material to its proper place; otherwise the plate will be porous. Proceed slowly until the flask is brought together,—never hurry it,—and cool slowly; otherwise the plate will be liable to spring. Celluloid differs from rose-pearl in the preparation; the latter is obtained by dissolving the cotton in ether and alcohol; the former by gum-camphor, under pressure. The coloring matter in celluloid is vermilion, being 1 part in 286.

Dr. Preterre has known of several instances in which celluloid discolored in the mouth, becoming quite black. Thinks it a perfect success, its manipulation being so easy. Thinks sets which had fissures appear in them were not sufficiently cured. Has also used rose pearl.

Dr. Jarvis spoke of a dentist at Warsaw who claimed to have put up twelve hundred (1200) cases of celluloid, thus far with no reason for dissatisfaction, having heard no complaints. Was delighted with the specimens of celluloid work exhibited by Mr. Flagg at the clinic to-day. Had used it very little himself, but had no broken cases to report, nor was any fault found with those which he had put up. Likes the color of the new lot even better than that of gum-teeth. To repair it, you have simply to clean the surfaces, wet both surfaces with spirits of camphor, being careful to leave no "drops" around on the plate, and go right on with the heating process; dovetails are useless.

Dr. Frank Abbott said there were cases in which the rubber can be used to much the best advantage, as where the plate is employed as a masticating surface, in which cases the celluloid is too soft, and rapidly wears away. Also, in regulating cases, the celluloid is incapable of the ready adaptability of rubber. Would not put it into the mouth with the expectation of having it last a great while. Thinks, for permanent sets, the nicest thing is continuous gum.

Mr. Flagg, in response to an invitation to speak on the subject, said that, by the aid of Mr. Hyatt, he hoped, in about six months, to show to the profession results from celluloid which would compare favorably with rubber or any other base, in point of strength, beauty, durability, and "naturalness."

Dr. C. E. Latimer believed that the tests of celluloid, in the factory, do not answer the conditions of the case; and that it wears away in the heat of the mouth much faster than in the heat of a room. One great objection to it is, that it does not unite perfectly when flowing around a band of metal.

Dr. C. P. Fitch thought that ptyalism from the use of rubber plates obtained only in cases where the patient has been previously salivated.

SOUTHERN DENTAL ASSOCIATION.

The following is a list of the officers and committees of the Southern Dental Association, until the next annual meeting of that body, to be held in the city of Memphis, Tenn., Tuesday, the 9th day of February, 1875, commencing at 10 o'clock A.M.

It is sincerely hoped and expected that the members of the following committees will correspond with each other, so as to act in concert, and furnish a report upon the subjects on which they are appointed, and thereby make our next meeting one full of interest and instruction.

OFFICERS.

President.—Dr. J. R. Walker, Louisiana.
First Vice-President.—Dr. Isaiah Forbes, Missouri.
Second Vice-President.—Dr. W. G. Redman, Kentucky.
Third Vice-President.—Dr. R. R. Freeman, Tennessee.
Corresponding Secretary.—Dr. Homer Judd, Missouri.
Recording Secretary.—Dr. Jas. F. Thompson, Virginia.
Treasurer.—Dr. J. Hall Moore, Virginia.

COMMITTEES.

Executive Committee.—Drs. W. T. Arrington, Memphis, Tenn.; W. H. Morgan, Nashville, Tenn.; Jas. S. Knapp, New Orleans, La.; H. J. McKellops, St. Louis, Mo.; S. H. Henkels, Staunton, Va.

Membership.—Drs. S. J. Cobb, Nashville, Tenn.; C. A. Jordan, Huntsville, Ala.; W. G. Redman, Louisville, Ky.

Publications.—Drs. R. B. Winder, Baltimore, Md.; J. F. Thompson, Fredericksburg, Va.; Homer Judd, St. Louis, Mo.

Dental Education.—Drs. Homer Judd, St. Louis, Mo.; H. J. McKellops, St. Louis, Mo.; B. F. Coy, Baltimore, Md.

Dental Literature.—Drs. W. H. Eames, St. Louis, Mo.; J. P. H. Brown, Augusta, Ga.; F. J. S. Gorgas, Baltimore, Md.

Physiology and Surgery.—Drs. W. W. H. Thackston, Farmville, Va. J. S. King, Nashville, Tenn.; A. F. McLain, New Orleans, La.

Histology and Microscopy.—Drs W. H. Atkinson, New York City; S. P. Cutler, Memphis, Tenn.; J. H. McQuillen, Philadelphia, Pa.

Dental Chemistry.—Drs. J. Taft, Cincinnati, Ohio; R. Finley Hunt, Washington, D. C.; Robt. Arthur, Baltimore, Md.

Pathology.—Drs. Isaiah Forbes, St. Louis, Mo.; Arthur Ford, Atlanta, Ga.; E. Floyd, Fayetteville, N. C.

Dental Therapeutics.—Drs. W. H. Morgan, Nashville, Tenn.; F Y. Clark, Savannah, Ga.; R. B. Winder, Baltimore, Md.

Operative Dentistry.—Drs. H. J. McKellops, St. Louis, Mo.; J. G. Wayt, Richmond, Va.; J. S. Knapp, New Orleans, La.

Mechanical Dentistry.—Drs. James Johnstone, Staunton, Va.; L. Augspath, Helena, Ark.; J. G. McAuley, Selma, Ala.

Voluntary Essays.—Drs. W. H. Morrison, St. Louis, Mo.; J. B. Patrick, Charleston, S. C.; H. B. Noble, Washington, D. C.

Dental Appliances and Improvements.—Drs. T. C. Stellwagen, Philadelphia, Pa.; Wm. Deason, Mobile, Ala.; W. G. Kingsbury, San Antonio, Texas.

James F. Thompson, M.D., D.D.S.,
Recording Secretary Southern Dental Association.

FIRST DISTRICT DENTAL SOCIETY.

The annual meeting of the First District Dental Society of New York was held June 2d, at the rooms of the Dental College.

The Clinic Committee reported very favorably on the clinics which had been held at S. S. White's Dental Depot, on the first Tuesday P.M. of each month during the season, and the society concluded to continue them during the summer in care of the same committee.

The society elected the following gentlemen as officers for the ensuing year.

President.—R. M. Gage.

Vice-President.—W. M. Reynolds.

Secretary.—W. E. Hoag.

Treasurer.—Chas. Miller.

Censors.—E. A. Bogue, W. A. Bronson, C. E. Francis, O. A. Jarvis, Wm. Carr.

Executive Committee.—Chas. Miller, C E. Francis, J. S. Latimer.

W. E. Hoag, *Secretary.*

EAST TENNESSEE DENTAL ASSOCIATION.

The eighth annual meeting of the East Tennessee Dental Association convened in Knoxville, September 16th, 1874. President Dr. W. F. Fowler in the chair. The meeting was one of considerable interest to all. Dr. Fowler read an essay on "Pivot Teeth;" Dr. W. H. Cooke, one on "Dental Neuralgia;" and Dr. Prothro, one on "Diagnosis." The essays were all ably discussed. Clinics were held daily by Drs. W. H. Cooke, R. A. B. Moyers, and S. B. Cooke.

A preamble and resolution expressive of the appreciation of the society of the valuable services of Dr. John Fouché, of Knoxville, was unanimously adopted.

A resolution was adopted requiring all the junior members to be examined on human anatomy at the next meeting.

The following were elected officers for the ensuing year.

President.—Dr. S. M. Prothro, Chattanooga, Tenn.

Vice-President.—Dr. R. A. B. Moyers, Pikeville, Tenn.

Corresponding Secretary.—Dr. M. M. Harris, Knoxville, Tenn.

Recording Secretary and Treasurer.—Dr. S. B. Cooke, Loudon, Tenn.

On motion, the association adjourned.

S. B. Cooke, *Secretary.*

MERRIMACK VALLEY DENTAL ASSOCIATION.

The twelfth annual meeting of this society was held in Plummer Hall, Salem, Mass., November 6th and 7th, 1874. Dr. D. B. Ingalls, President, of Clinton, Mass., in the chair.

The election of officers for the ensuing year resulted as follows:

President.—Dr. E. G. Cummings, Concord, N. H.

First Vice-President.—Dr. A. M. Dudley, Salem, Mass.

Second Vice-President.—Dr. C. G. Davis, New Bedford, Mass.

Recording Secretary.—Dr. W. E. Riggs, Lawrence, Mass.

Corresponding Secretary.—Dr. A. T. Bigelow, Boston, Mass.

Treasurer.—Dr. H. Hill, Manchester, N. H.

Librarian.—Dr. A. Lawrence, Boston, Mass.

Executive Committee.—Dr. D. B. Ingalls, Clinton; Dr. J. H. Kidder, Lawrence; Dr. G. A. Young, Concord, N. H.; Dr. B. P. Merrill, Plymouth, N. H.; Dr. J. W. Palmer, Fitchburg, Mass.

Subjects discussed,—"Dental Education;" "Poison by Amalgam Fillings;" "The Replanting and Transplanting of Teeth."

W. E. Riggs, *Recording Secretary.*

BROOKLYN DENTAL SOCIETY.

THE seventh annual session of this society was held on Monday evening, October 12th, 1874.

The following officers were elected for the ensuing year :

President.—Dr. M. E. Elmendorf.

Vice-President.—Dr. C. W. Harreys.

Recording Secretary.—Dr. C. P. Crandell.

Corresponding Secretary.—Dr. A. N. Chapman.

Treasurer.—Dr. F. W. Dolbeare.

Librarian.—Dr. C. H. Biddle.

C. P. CRANDELL, *Recording Secretary.*

PITTSBURG DENTAL ASSOCIATION.

AT a meeting of dentists, held in Pittsburg, Tuesday, Nov. 10th, a resolution was passed to organize an association to be called the "Pittsburg Dental Association."

An election of officers was held, with the following result :

President.—Dr. M. E. Gillespie.

Vice-President.—Dr. Jas. S. King.

Secretary.—Dr. H. W. Arthur.

Treasurer.—Dr. J. G. Templeton.

Board of Censors.—Drs. J. G. Templeton, W. F. Fundenberg, Gale French.

Executive Committee.—Drs. Calvin King, J. G. Templeton, H. W. Arthur.

H. W. ARTHUR, *Secretary.*

TESTIMONIAL TO DR. BARNUM.

THE following correspondence would have been published sooner, had it not been for the fact that several of the gentlemen whose names appear below were dilatory in forwarding their subscriptions.

C. E. F.

33 WEST 47TH STREET, NEW YORK, Jan. 2d, 1874.

DR. S. C. BARNUM,—

My Dear Sir :—By request of the committee appointed to procure the testimonial recently presented to you, in acknowledgement of your valuable gift to our profession,—the Rubber Dam,—I inclose the names of the gentlemen who have shown their appreciation of your kindness by contributing to this object.

Very truly yours,

CHAS. E. FRANCIS.

110 West 45th Street, New York, Jan. 3d, 1874.

Dr. C. E. Francis,—

Dear Sir:—Your favor of the 2d inst. is at hand, with accompanying list of names, showing to whom of my professional brethren I am indebted for a most elegant watch and chain. I return my sincere thanks, not only to all those to whom this list refers, but to yourself and committee, in selecting such a valuable and useful testimonial. I assure you I prize it highly, and of it am greatly proud.

Truly yours,
S. C. Barnum.

NAMES OF CONTRIBUTORS.

Dr. A. C. Hawes, New York City.
" E. A. Bogue, " "
" W. A. Bronson, " "
" Chas. Miller, " "
" R. W. Varney, " "
" M. L. Chaim, " "
" O. A. Jarvis, " "
" J. F. P. Hodson, " "
" C. D. Allan, " "
" W. H. Dwinelle, " "
" W. H. Allen, " "
" F. H. Clark, " "
" Dwight Smith, " "
" Geo. H. Glenney, " "
" J. C. Abrams, " "
" Chas. Merritt, " "
" S. Hassell, " "
" Geo. S. Allan, " "
" C. P. Grout, " "
" E. G. Roy, " "
" W. Carr, " "

Dr. N. W. Kingsley, New York City.
" F. Heindsman, " "
" S. G. Perry, " "
" S. H. M'Call, Binghamton, N. Y.
" T. C. Royce, Middletown, N. Y.
" A. J. Waid, Grosvenor, N. Y.
" C. Fones, Bridgeport, Conn.
" J. H. Smith, New Haven, Conn.
" Jas. McManus, Hartford, Conn.
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" J. W. Crane, Paris, France.
" Isaiah Forbes, St. Louis, Mo.
" Homer Judd, " "
" W. H. Eames, " "
" R. H. Porre, " "
" Morrison Bros., " "
" M. McCoy, " "
" H. J. McKellops, " "
" Jos. Spyer, " "
Brooklyn Dental Society (no names).
Several Dentists of Boston " "

EDITORIAL.

TORSION AND REPLANTATION.

Within the last few months numerous communications have appeared in the dental journals in reference to these operations. It is noteworthy how generally they are treated of as simple mechanical procedures. But assuredly elements beyond the mere mechanical enter into and should determine the wisdom of all such operations. Whoever deals with vital tissues, will learn that "circumstances alter cases." An operation which may in one instance be perfectly justifiable, and suggestive only of good results, may, in another case, be contraindicated so strongly that, if evil consequences ensue, the verdict would be compelled that ignorance or carelessness was manifested by the practitioner.

In cases of injury or of abnormal growths threatening life or limb without surgical interference, the hazard of untoward results must be accepted by the operator; the choice of evils as well as of uncertainties must be made; but where the problem is merely the correction of an irregularity, involving only the question of improved appearance, the risk of consequences more to be dreaded than the existing condition should be taken into the account.

It is a curious and instructive lesson, that Nature's toleration of heroic treatment seems to be in proportion to the absolute necessities of the case. Thus tetanus, and perhaps erysipelas, are more apt to follow upon slight than upon severe operations. The deaths from anæsthetics are startlingly associated with minor operations. A tight boot, the clumsy paring of a corn, a puncture by a tack, the scratch of a fellow-sleeper's nail upon the skin, and other like trivial matters, have resulted not unfrequently in serious disturbances, and even in death.

An injury of a member sought to be retained is generally more troublesome than the results of amputation, and torsion, it is not hard to believe, is vastly more liable to produce mischief than extraction would be.

There are wonderful differences of susceptibility in different individuals, and equal differences in their reparative power. There is also in the same individual, at different times, a greater or less power of resistence to deleterious influences. Not only therefore should the idiosyncracies of the individual be considered, but the existing systemic condition. Every one is liable at times to a general lowering of the resistive capacity, in which state, as patients often express it, "every scratch becomes a sore." The probabilities of success in torsion or replantation, under such circumstances, would evidently be much less than in the normal condition, when union by first intention takes place even after severe wounds.

The ability to estimate constitutional predisposition or systemic degeneration would be of essential service in determining the likelihood of success or failure in such operations as those alluded to. It must be granted that it is not always possible to be so skillful in diagnosis as surely to foretell success, but on general principles the chances may be approximately estimated.

NEW YORK ODONTOLOGICAL SOCIETY.

A SPECIAL meeting of this society was held December 14th, 15th, and 16th, 1874. Unusual preparation had been made to give more than ordinary interest to the occasion. Distinguished practitioners from various parts of the country had been invited and were present, some of them having prepared papers on special topics. The reading of these papers and the discussion which followed made the meeting one of much interest and profit.

We had expected to present a synopsis of the proceedings in this number of the DENTAL COSMOS, but it did not come to hand in time.

Most of the papers read will appear in this journal during the present volume.

BIBLIOGRAPHICAL.

A GUIDE TO THE PRACTICAL EXAMINATION OF THE URINE: for the use of Physicians and Students. By JAMES TYSON, M.D., Hospital Lecturer on Pathological Anatomy in the University of Pennsylvania; Professor of Physiology and Histology in the Pennsylvania College of Dental Surgery, etc., etc. Philadelphia: Lindsay & Blakiston. 1875.

This is a comprehensive but compact manual, setting forth the general physical and chemical character of the urine; its different constituents in health and disease; its deposits; the differential diagnosis of renal diseases; the composition of urinary calculi, and the reagents and apparatus used in analysis. It is illustrated by thirty cuts.

The style of the author is concise and clear. We commend the book as a valuable compend of the subjects treated.

STUDIES IN THE FACIAL REGION. By HARRISON ALLEN, M.D., Professor of Anatomy and Surgery in the Philadelphia Dental College. Illustrated by fifty-six wood-cuts. Reprinted from the DENTAL COSMOS.

The series of original and instructive papers by Dr. Allen, which have appeared in the DENTAL COSMOS from month to month for the last year and a half, are here presented in convenient form for study and reference.

The volume is unique, because of the effort to embrace in small compass a consideration of the anatomy, physiology, and pathology of the facial region with the localization of diseased action, thus grouping together facts which otherwise would have to be sought for throughout many volumes.

One-half of the fifty-six illustrations are original, and several of the others are copied from rare sources. Of the original, many are in illustration of points in the anatomy of the teeth not hitherto observed.

Every dentist who is ambitious to acquire a completeness of knowledge of the relations and dependencies of the organs and parts with which his specialty is concerned, will be glad to possess this volume. Indeed, we cannot understand how any can afford not to have it.

OBITUARY.

ELEAZAR PARMLY, M.D., D.D.S.

Dr. Eleazar Parmly, whose death from pneumonia took place in New York on Sunday, December 13th, 1874, was born in Braintree, Vermont, March 13th, 1797. He was the third of five sons of Eleazar Parmly, four of whom afterwards became dentists. Before he was twenty he left his father's farm, and (dental colleges in this country being then unknown) pursued his studies in Montreal, Canada, and, with his elder brother, Levi, in New Orleans, Louisiana.

About the year 1820 he embarked for Europe, where he perfected himself in his studies, and practiced successfully in London.

About the year 1823 he returned to the United States, and established himself in the city of New York, where he soon acquired an extensive and remunerative practice, and for more than thirty years stood at the head of his profession.

After the death of his wife,—a lovely and accomplished woman,—he sought comfort and recreation by traveling, and, about the year 1861, entirely gave up active practice in his profession.

A distinguishing characteristic of Dr. Parmly was a *scrupulous attention to little things*, which, joined to integrity and cultivated taste, laid the foundation both of his fortune and his popularity as a dentist.

Dr. Parmly was also distinguished for his fidelity in all the virtues and relations of private life. For many years his home in New York was the resort of persons from all countries and of all creeds. He died, as he had lived, a Christian gentleman.

ASA HILL, D.D.S.

Died, suddenly, at Norwalk, Conn., Nov. 25th, 1874, of heart-disease, Dr. Asa Hill, aged 59 years.

Dr. Hill was born in Norwalk, Conn., November 20th, 1815; studied dentistry with Dr. David P. Knapp, in Danbury, and commenced the practice of his profession in Norwalk, where he continued it up to the time of his death. Dr. Hill was an earnest student, a skillful operator and a Christian gentleman. He secured and retained the esteem and affection of his professional brethren, and the confidence of his fellow-townsmen, to an unusual degree, and died lamented professionally and socially.

TRIBUTE TO DR. T. B. HITCHCOCK.

The *Monthly Review of Dental Surgery* pays the following tribute to the memory of Professor Hitchcock:

"The sad news of the premature death of Dr. Hitchcock, the Dean, and the life and soul of the Harvard Dental School, has arrived since the last number was issued. He is best known in this country as the editor and annotator of Wedl's 'Dental Pathology,' and as the author of 'Reports on Dental Histology.'

"Threatened, a few years ago, with phthisis, he was unable to relax his labors in science, in practice, and at the school; now he has succumbed to an attack of cerebro-spinal meningitis, adding one other to the roll of victims of overwork.

"An enthusiast in all he undertook, he has won for himself the highest esteem of the medical profession in Boston. Now that he has gone, it will indeed be hard to fill his place, for few such as he are to be found in the ranks of our profession.

"Honest of purpose, fearless of speech, and kindly of heart, he had won the heart and admiration of every one with whom he came in contact. Now that he has died in the prime of his life and in his full vigor, none will be more missed or more sincerely mourned. It will, indeed, be long before those who have lost in him a warm-hearted and dear friend will cease to recall the memory of pleasant hours spent with Dr. Hitchcock."

DEATH OF DR. GEO. E. HAWES.

At a meeting of dentists, called in New York, upon the receipt of the news of the death of Dr. Hawes, Dr. Jno. Allen was chosen chairman, Dr. J. G. Ambler secretary, and a committee on memorial appointed, consisting of Drs. J. G. Ambler, Jno. Allen, W. H. Atkinson, J. Parmly, and Lemuel Coville.

Resolutions expressive of their appreciation of the Christian character and professional acquirements of the deceased were adopted, and the following memorial prepared for publication in the journals:

"Dr. Geo. E. Hawes, the subject of this brief obituary, was born in Wrentham, Massachusetts, May 28th, 1810. His father, Col. George Hawes, was a man of integrity and uprightness, whose patriotism was of an active character in our Revolutionary struggles, he filling his place in the ranks of the Colonial patriots, battling against aggressive and oppressive acts of the mother country, and subsequently serving the State in its halls of legislation. His mother still survives him, at the advanced age of *ninety-five years*, having laid all the members of her immediate family in the resting place of the dead. Dr. Hawes commenced his preparatory course as a dentist in the office of the late Dr. John Lovejoy, and, after completing his course of study with him, commenced the practice of his profession in Park Place. After years of diligent and successful practice, he then removed to Bond Street, where he continued his professional career until incapacitated by impaired health.

"He was an eminently successful dentist, retaining the confidence of his patients by the perfection of his operations and his uniform urbanity.

"By the members of our profession he was universally esteemed; his opinions on difficult operations or cases in practice were appreciated, because they were judicious and sound, and there were none who knew him who do not feel that a safe, competent, conscientious operator has been lost to the community, and an appreciative and safe counsellor by the profession. We shall miss his counsel and experience in our deliberations and discussions. Dr. Hawes was a Christian gentleman, who adorned the circle in which he moved, and those who knew him best appreciated him most."

The family who survive him have, in the recollection of the past, and the assurances of his blessed future, all the consolation necessary to assuage their grief and make supportable their great bereavement.

[Signed] J. G. AMBLER, *on behalf of Committee.*

PUBLISHER'S NOTICE.

THE NEW VOLUME.

THIS issue introduces the Seventeenth Volume of the DENTAL COSMOS. Succeeding numbers will be issued on the first of each month following.

We are able to announce a very material and constant increase of the subscription list, but should be pleased to see it embrace very many more new names, believing that no practitioner could fail to derive benefits from its perusal greatly beyond its cost.

We feel assured that its usefulness is increasing with each volume,

—that it is more and more efficient in promoting the best interests of the dental profession.

We assume that all who desire to receive it will notify us to that effect; consequently, we send it only to actual subscribers, believing this to be the most satisfactory arrangement for subscribers as well as for the publisher. We shall adhere to the system of CASH PAYMENT IN ADVANCE.

SAMUEL S. WHITE.

VULCANITE LITIGATION.

THE above heading greets the reader for the last time in the DENTAL COSMOS until the Smith appeal shall have been argued, inasmuch as the decision in Michigan, following those of the other circuits which adopted Judge Shepley's opinion, terminated, or ought to terminate, all contests *short of the United States Supreme Court.*

In his opinion—a copy of which has been furnished us by Messrs. Lee & Alvord, of New York—Judge Emmons, with a kindness which should be understood and appreciated, points out the reasons why further litigation under the Massachusetts record would be unavailing, except so far as to submit the questions and accept a decree *pro forma* as the basis of a further appeal to the Supreme Court. We have for some time entertained and expressed the same views of this matter, and while waiting from month to month for the conclusion of the Michigan cases, with but slight hopes of a favorable result, we are now prepared to announce that the litigation has reached the point where, pending the final hearing and decision, all further public discussion upon it would be useless to the profession and discourteous to the learned judge who made the original decision, and to those judges who, following the recognized custom of judicial comity, adopted his opinion. We shall, therefore, abstain from reference to the further course of the litigation; and, as embodying the soundest conclusions and presenting a most comprehensive statement of the situation, we give herewith the report of Messrs. Cox, Follett & Cochran, of Cincinnati, counsel for the Committee of the Ohio Dental Society on the Goodyear Dental Vulcanite Litigation, which we publish by permission, and which renders a fuller statement on our part unnecessary.

Our own efforts in this connection have been viewed in various lights; but, as we have acted only in response to the repeated requests of a large number of dentists, and as their representative, with but one object in view, viz., to complete and present for adjudication *a test case*, the final decision of which should determine forever the questions between the Goodyear Dental Vulcanite Company and the public, we cannot refrain from acknowledging with gratification the general indorsement of our course by the dental profession and the several special approvals of national and State dental societies. These have been so numerous as to warrant us in the belief that, although the decision reached by the judge on the facts presented is different from that which was anticipated, the test case has had a full and fair presentation, upon a record from which nothing of value has been omitted, and to which *no addition of value* has been suggested, notwithstanding that it has been canvassed, considered, and discussed so universally that we may deem it to have received the careful attention of almost every dentist, as it has that of many lawyers. It may therefore be assumed that if the Cummings patent is valid in the opinion of the Supreme Court after hearing the Smith appeal, that opinion will be based upon all the data that could be obtained,—proved, illustrated, and exemplified so clearly as to give the Court the guidance of the plain facts.

SAMUEL S. WHITE.

JACOB D. COX,
JOHN F. FOLLETT,
W. C. COCHRAN.

LAW OFFICES OF COX, FOLLETT & COCHRAN,
82 W. THIRD STREET,
CINCINNATI, November 28th, 1874.

Messrs. Smith, Rehwinkel & Horton, Committee of the Ohio Dental Society on the Goodyear Dental Vulcanite Litigation:

GENTLEMEN,—As it is important that you should be advised of the present status of the litigation in regard to the validity of the Cummings Patent, in order that the association you represent may act intelligently in relation thereto, we beg leave to present the following report:

Answers were promptly filed in all cases commenced against members of your association in the Northern and Southern Districts of Ohio, raising the same issues that were presented in the case of the Goodyear Dental Vulcanite Co. et al. *vs.* Daniel H. Smith, then pending, and since decided in the United States Circuit Court for the District of Massachusetts. Realizing the great difficulty and expense that would be involved in getting the proper proofs for a defense in these cases, we endeavored to secure an agreement with counsel for the complainants that the testimony already taken in the Smith case might be taken and used as proofs in our cases, to be supplemented by such other and further proof as we might be able to procure ; but our proposition to this effect was declined.

It was then understood that all cases pending in Ohio should abide the decision of some one case which might be selected as a test case, decisive of all others within this State. We proposed that the case of J. H. Warner, of Columbus, O., should be selected as the test case, but before our proposition had been accepted and the argument concluded, we were advised that there was a case pending before the Circuit Court, in Michigan, which was fully prepared for hearing, and would be tried before his honor, Judge Emmons, the presiding judge in this Judicial Circuit, and Judges Longyear and Withey, presiding in the Eastern and Western Districts of Michigan, respectively. The proofs of this case embodied all the proofs and exhibits taken in the Smith case, and some additional testimony which we were informed and believed would materially strengthen the proofs taken in the Smith case, and make it in some respects a better case. As it was very evident that a decision of this case, one way or the other, would govern all other cases brought within the same Judicial Circuit, it seemed to us useless to proceed with our cases here. We felt confident that no injunctions would be allowed in our districts, so long as that case was pending in Michigan. A victory for the defense in that case would be a practical victory for the Ohio dentists, and a defeat in that case would operate equally as a defeat of the profession here.

Under these circumstances, and as the Michigan dentists were in need of support and desired the assistance of their counsel at the trial of their case, we advised your committee that it would be not only an act of generosity, but an act of self-protection, to afford them all the assistance in your power to enable them to make a proper presentation of their case, and to be represented by your own counsel at the trial. In this your committee cordially agreed, and it was decided that we should prepare for argument and assist the counsel for the defense in the trial of the Michigan case whenever it should be set for hearing.

Meanwhile the Smith case had been decided in favor of the complainants, and the decision had a very discouraging effect upon the minds of the dentists everywhere throughout the country.

The decision of Judge Shepley was not, however, in any legal manner conclusive upon courts of equal jurisdiction in other circuits of the United States, and we were led to indulge the hope that the Circuit Court sitting in Michigan would hear the case on its merits, as if the questions involved had never been passed on before, and decide it independently of all prior adjudications. With such expectations in our minds, we felt very confident that the defense would prevail, and that for once in the history of this litigation the Cummings reissue would be declared invalid.

We made thorough and careful preparation for the argument of this case, which was first set for hearing in June, 1874, and adjourned from time to time until the 5th day of November, 1874, when it was tried and disposed of. Contrary to our expectation, we found the Court disposed to follow former decisions in these cases, unless this case could be clearly distinguished from all preceding ones.

We found on an examination of the evidence and exhibits that they embraced no material point not substantially included in the Smith case, and so admitted, and the Court, therefore, following the uniform line of adjudications heretofore had on the Cummings Patent, decided in favor of the complainants, and awarded an injunction against the defendant.

This decision practically disposes of all cases pending in Ohio, and it would seem vain and useless to attempt to make any further defense in the lower courts.

The Smith case has been appealed, and is now pending before the United States Supreme Court, whose decision will be final and conclusive on the questions involved in all these cases. THE SMITH CASE PRESENTS SUBSTANTIALLY ALL THE ISSUES, OF WHICH WE ARE ADVISED, THAT CAN BE RAISED AS TO THE VALIDITY OF THE CUMMINGS PATENT, AND THE CHARACTER OF THE PROOFS AND EXHIBITS IS BETTER PERHAPS THAN ANY THAT COULD BE FURNISHED IN A CASE COMMENCED *de novo.*

Having given to the case the most careful and painstaking attention, having analyzed the evidence from beginning to end, and having made a thorough examination of the law upon all material points, we cannot but feel, and therefore express, the greatest confidence that the decision of the Supreme Court on final hearing must be favorable to the defense, and that the Cummings Patent will be adjudged invalid.

The Smith case will have the precedence of all other similar cases on the docket of the Supreme Court, and it already commands the earnest support of the Eastern dentists, and we feel that the interests of our clients now demand that they, too, should concentrate their efforts for the proper presentation of that case to the Supreme Court.

So far as the cases now pending in Ohio are concerned, injunctions will be granted, and unless the cases are settled the defendants will have to account for damages. We should advise members of the association to get out of Court with as little additional expense as possible, and, so far as practicable, settle with complainants on condition that they dismiss their suits.

We are very respectfully yours,
(Signed) COX, FOLLETT & COCHRAN.

PERISCOPE.

Medical Education.—If there is one thing more than another upon which the editorial wisdom of the *Philadelphia Medical Times* has come to a fixed conclusion, it is the worthlessness of the American system of medical education. If there is any one editorial purpose more definitely settled than another, it is that whatever of influence this journal may possess shall be used to aid in effecting a radical change in that system. Tersely, the method may be said to be a pitting of one college against the other in a race for students,—a race whose success often depends not so much upon the ability of the faculty to teach, and the opportunities afforded for study, as upon the ease with which the coveted M.D. is granted. The average American bows at the shrine of "getting on," and to get on means to get money. Very often the medical student is poor, so that he is doubly spurred by his inborn genius for getting on and by the necessities of the case; he *must* have his diploma as soon as possible. Once the coveted parchment in his possession, he will trust to his wits and industry. And, to give him credit, his "wits" rarely fail him, for we honestly believe the great gift of Providence to this nation, or, to speak in the terms of the popular science of the day, the great product which the circumstances of races, life, and climate have evolved on this continent, is "wits."

The professors' emoluments depending upon the number of students, and the professor having the sole right of fixing the standard of attainment necessary for graduation, the result must inevitably be a gradual cheapening of the bait. Medical education is in a bad enough state in the East, but in the West its condition seems to be worse. We hope we shall not offend the delicate sensibilities of any of our Western editorial brethren in saying this. It certainly cannot truthfully be denied that the colleges in that section have been underbidding one another in the matter of lecture-fees, until only forty, twenty-five, or even twenty dollars, instead of one hundred and forty dollars, are asked for a whole winter's course.

When professors or faculties, for the sake of outstripping their competitors, strip themselves of that which is so dear to every man, a proper recompense for work, it is easy to perceive what will be the decision of questions concerning the requirements for graduation: the major, the good of self, usually embraces the minor, the good of others. —*Editorial in Phila. Medical Times.*

Reform needed in the Curricula and Examinations of Colleges.—I call to mind that the position and progress of our profession depend entirely upon, and are bound up in the history of, those who year after year enter our places of instruction; their principles and motives, their conduct and actions, will either elevate or degrade it,—will either extend or mar its usefulness. I realize that each one of you, individually, must have some influence in this direction, and some of you may have a very great influence. . . . .

Regarding the present aspect of things, notwithstanding all improvements, it must be acknowledged that we are far, yes, very far, from arriving at anything like perfection in teaching or examinations, and that there is plenty of room for further reform. As to examinations, most of them as now conducted are anything but complete and efficient tests of a man's real fitness to enter upon the responsible duties of a medical practitioner.

Gentlemen, it would be a most excellent and desirable thing for all concerned, but especially for you, if everything connected with examinations and teaching were now settled once for all,—at least for a long time to come. It seems to me that there is very little difficulty about the matter. The principles upon which they should be conducted are clear enough, and we know tolerably well what is needed. The only thing required now is that the various authoritative bodies, and especially those which grant degrees and diplomas, should come to a mutual understanding and agreement in an unselfish spirit. But so long as one council fights against another, and this or that corporation sticks up for its own dignity and emoluments, instead of having the general welfare of the profession at heart, and being ready, therefore, to make some sacrifice, any final arrangement seems almost hopeless. It is really high time that all this trifling should be put a stop to, and that some higher authority should step in, and compel all concerned to submit, whether they will or not. We urgently want a satisfactory curriculum of study and satisfactory examinations for every part of this kingdom, and it is quite ridiculous to allow the numerous places granting supposed qualifications to practice to go on just as they please.—*Introductory Lecture delivered at University College (London), by Frederick T. Roberts, M.D.*

SPECIAL DEGREES.—We print to-day an article from the pen of Dr. Garretson as a leader, partly in order to give prominence to it, and partly because in many points we agree with the sentiments therein expressed. As comment, we simply reiterate what we have before said, that if dentists are ambitious to be considered medical specialists, they must undergo a general medical education; that so long as there are distinct dental colleges giving a peculiar degree, so long will physicians refuse to acknowledge dentists as members of the profession. An individual dentist who has taken the medical degree may assuredly be received as a brother practitioner, but a simple D.D.S. never. The difficulty with the physician practicing dentistry is that he is classed by the general and medical public with the mere dentist. Why should there be D.D.S., any more than D.O.S., or D.A.S., or D.T.S., or D.S.M., etc., etc., *ad nauseam?—Editorial in Phila. Medical Times.*

UNIVERSALITY IN EDUCATION—SPECIALISM IN PRACTICE.—The heading of this article, which constitutes a curt putting of a most important matter by a former editor of this journal, serves particularly well as a text to a few thoughts which the writer wishes to present concerning the specialty of Oral Surgery.

It is a fact not to be denied or disputed, that, as communities grow in numbers and in intelligence, so the work of the individual members thereof breaks itself up into the practice of specialties; and this occurs as the result of an organization in man which leads him to take cognizance of results as evidences are presented to him in the practical working of things.

Specialism, however, is a bad thing for the individual man; that is, it is bad for him whose manhood and whose mental powers are merged and allowed to become lost in specialism; it is, on the contrary, a great good thing for a community at large, as is demonstrated by the voice of that common experience out of which the practice obtains and grows.

The bad of specialism finds all the antidote possible in that circularity of education which is the constant reminder to a specialist of the littleness of the work in which he is engaged; it holds him to modesty and to a becoming humility in the presence of the alma mater; it is the balance-wheel.

That the profession at large have long been found disposed to ignore specialties and the specialists is a matter not at all to be wondered at, neither found fault with. Specialists, until the present age, have almost universally proved to be arrant quacks; and the assumption by such of a pretension to belong to the grandest of professions could not possibly have proved else than a stench in the nostrils of the educated and refined. The title of doctor ought to imply a very great deal; and to him whose learning and whose habits of thinking and acting place him on a level with the proper meaning of such a title, it cannot but appear as an offense in any one whose assumed relation with the degree serves but to degrade and belittle it.

As a specialty, what is known as Dental Surgery has assumed prominent place, and it has come to such position because of the intrinsic merit found in it. It embraces a multitude of doctors,—this term being employed in the fulness of its ordinary meaning,—and it affords harbor for perhaps quite its share of impostors, whose knavery is equalled only by their ignorance and impudence. In the ranks of this specialty, the writer does not hesitate to say, are to be found some of the best-educated men in the country; and, so far as the ethics are concerned, he has as little hesitation in affirming that he has never met with higher sense of honor among the practitioners of any profession; the physician at large may claim no precedence over the dentist in this respect.

Like general surgery, the dental specialty has had an up-hill track; and, like surgery at large, it has come to its present position because of the good encompassed in it, and which good the people cannot do without. As a specialty, it is a something fixed; it is a thing that is.

Has it attained to its highest good?

Galen, centuries ago, made the assertion "that the cause of the toothache was known alone to God." In this remark resides, perhaps, the origin of dental inquiry. Compare now this ignorance with the experience comprised in the dental curriculum of to-day. Such a comparison will best show what dentists and dentistry have done.

But what has been accomplished, while it is very much, is seen and felt by the true leaders of this specialty not to be any way near what is to constitute the fulness of its work; hence, year by year, the studies pursued in dental colleges grow wider and wider. Chairs of surgery have been established; chemistry is taught with a thoroughness that leaves little to be accomplished; physiology, not satisfied with the text-books, takes its secrets from organs which pulsate and are alive; diagnosis has long ago passed beyond the mystery of Galen, and seeks to-day for the hidden things which lie among brain-cells and hepatic lobes. To-day, to be a professor in a dental college is to occupy a position that reflects honor on a man, and which affords the occupant of such a chair a field of great usefulness in which to labor.

Dental surgery, however, is but a little part of a common circle to which its duties pertain; hence, step by step, slowly, it is true, yet surely, is the specialist of this department advancing to a work more worthy his education, and more in correspondence with the claims he puts forth to belong to a learned profession; the dental surgeon is advancing into the oral surgeon.

Oral surgery—while it educates the dentist, simply as a dentist, more soundly and scientifically than heretofore—treats of the diseases and surgery of the mouth, jaws, and associate parts. What it is, the writer cannot but think that he has clearly and explicitly set forth in his book, entitled "A System of Oral Surgery," and he may not but rest under the conviction that many years will not elapse before it will be found that in this new departure the complexities of the surgery of these parts will be rendered not less plain than have been the mysteries of Galen's confusion concerning the cause of toothache. In such a new departure, suffering humanity will come to a gain of not less consequence than that found in the establishment of the specialty of ophthalmic surgery; and who does not understand what great good has been evolved here?

But to be an oral surgeon demands in every respect the same order of education that pertains to the surgeon and physician at large. Hence, all practitioners of dentistry who have advanced into this new field are found possessed of the degrees both of dental and medical colleges; and, as things now exist, these two roads must be passed over before one can come to any ability to practice oral surgery: he must pass through a dental school that he may perfect himself in the knowledge of dental surgery: he must go through the medical college that he may know of general practice. And even yet a deficiency is found. The means to make special study of his special subject the medical school fails properly to furnish. He may listen to a few lectures on the subject of mouth- and face-operations, and the clinic will furnish him distant views of mouth-diseases, but these are not at all sufficient to his purpose. He needs to handle, to operate, and to prescribe for himself.

The oral surgeon needs lessons which, as yet, are widely scattered, —so scattered, indeed, that to attempt to master the subject, as becomes a specialist, is necessarily to involve one's self in expenses which the purse of few students will be found able to bear.

What, now, is the remedy?

No question is so constantly propounded to the writer as the query concerning the manner of studying oral surgery; and it is a confession he is compelled to make that there is no plain answer to it.

The medical college, as at present constituted, cannot make an oral surgeon, neither can the dental school. The one teaches well and fully part of what the student desires to learn, and the other informs him as thoroughly in another direction of the knowledge required; but these are as two end-spans of a bridge the middle arch of which is lacking, —a bridge all right so far as it goes, but over which one cannot pass.

The question is seen, therefore, to resolve itself into one of a new departure,—a departure felt to reside in that same evolution which brought the specialty into being. Should dental schools resolve themselves into full medical colleges? or will it be that the demand shall be met by the establishment of special hospital advantages in connection with the already matured medical institutions?

To one intimately acquainted with the classes of professors connected with the two orders of schools, these queries are not so easy of answer as they would seem to be to him who knows alone either side. Dental colleges are as young men overflowing with the vigor of fresh life. It is a mistake to think these incompetent to the task; it is only that they delay on the Cisalpine side of the Rubicon; once in, they will hardly stop short of Rome. Medical schools, on the contrary, hesitate because they doubt the humor and intentions of the men they would gladly receive into the order of their alumni: they do not fully recognize the stature to which the confrère has developed.

A specialist cannot, and should not, be received into the common brotherhood of medicine without his coming to a common platform as regards all that makes the doctor. The ophthalmic surgeon has recognized this; and to-day he occupies just such a position as it is desirable to enjoy,—he has his special hospitals, but he has no college, no peculiar diploma. His general education is alike with his medical brethren; his privileges are the same.

The writer may here stop. Further than presenting these brief data, he does not feel at liberty to intrude on the pages of this journal. He has desired simply to suggest the consideration of the subject to those who are intending to become oral surgeons, and, as well, to those who are to decide the questions as to how oral surgeons are to be educated. Shall such decision be rendered first by a medical or a dental school? Will the ranks of oral surgery be filled by those who are to-day physicians, or will the matriculants come from among those who now are at the head of the dental specialty? Come from somewhere they surely must, and will: evolution, like revolution, never goes backwards.—*Jas. E. Garretson, M.D., in the Phila. Medical Times.*

General and Special Education.—What I would say of education is only as it concerns you as students,—and it comes to this. If I, as a surgeon, may venture to go so far as to offer any advice to you who are to become dentists, it would be—While you are students here, and as students, widen and extend and fortify the basis of your professional education. Be not in a hurry to complete your studies. Be rather anxious to make every step you take secure. Nay, if only you spend the time well, you will do wisely to prolong your hospital studies, for it is hardly possible that such precious opportunity can ever recur. And for a like reason give good heed to those subjects of your studies which some will tell you are of no practical account. It is not because they are in every sense the most important,—no one assumes this,—but because, when you give up their pursuit here, the chances are that you will never trouble yourself about them afterwards. Remember that all your future labor will be in a special direction; that your work, if it is to be successful in the business of your life, must be hereafter and even now directed upon a particular point—upon the attainment of skill in the practice of a special art; and that therefore it will be well for you, while you have the best opportunity for it, to lay the foundation of what may be called a good general professional education; so that you may not merely assent passively to the view, but come thoroughly to realize the fact that the teeth are parts of the living body, and hold certain important relations to various other parts; that they are not isolated structures in their diseases and morbid actions, but suffer in this way more or less like other parts; that, in a word, although they have, as every other part has, a special, they have not nevertheless an isolated pathology,—and this because, although they have, as every other part has, a special, they have not nevertheless an isolated anatomy and physiology. Naturally parts of a whole, so are they in their defects and diseases. Therefore,—and pardon me if the inference be a trite one,—therefore, to know the teeth well, you must know much of the whole body. You will best work out the diseases of the teeth, not by confining your attention to them alone, but by comparing these with the like morbid actions elsewhere, and so looking at disease here by the light thrown upon it from around. And to know what disease means at all, you must surely, first of all, know something of health; and so, believe me, you will cure a toothache, or prevent one, all the better by-and-by for giving attention to anatomy and physiology now. And thus, gentlemen, because the longer you live and the larger practice you have, so will your thoughts and ideas tend to become concentrated on a particular study, enlarge well and securely the field of your observation and reflection here.—*Address to students at the London Dental Hospital and School of Dental Surgery, by William Scovell Savory, F.R.S.*

Special Education.—The great problem of education always has been, and still is, to secure in due proportion instruction and the development of the mental faculties. It is this which constitutes the chief difficulty alike in the common education of childhood and the special education of later life. The mind can be trained only by means of knowledge imparted to it; but the acquisition of knowledge does not necessarily imply mental culture. Propositions may be learned to an almost unlimited extent by the child or the youth; and yet the mind may remain unable to ascertain for itself a single new fact, or judge of the truth or falsehood of those which are presented to it, except within the very narrow range in which the common influences of every-day life constitute a rough mental education, often all that the individual obtains.

The illustration which the medical profession presents of the truth of these remarks is but too obvious. Clearly does every day's observation show that, in spite of "sad experience," wisdom lingers, even though knowledge comes to the individual or to the mass. If we look around and consider the character of the majority of supposed additions to our knowledge of disease and of its treatment which fill up the columns of our journals, and crowd the papers read at our societies, and reflect on the absurdly false theories of pathology and therapeutics which obtain wide currency in the profession, it is but too clear that scientific instruction may be, in no sense, scientific education. The experiments and observations which prove only ignorance of the simplest rules of scientific inquiry, the hasty generalizations in which only one of a dozen conditions is taken into account, the crude guesses which pass for inductions on the strength of bold assertion, continually afford illustrations of the entire incapacity of many, if not of most, members of our profession for making any real addition to our knowledge; an incapacity due chiefly to want of training. It is for this reason, among others, that medicine lags so far behind the sciences on which it rests.

When we scrutinize the character of the medical curriculum, we cannot be surprised at this result. Its first object (as, of necessity, is that of all teaching) is to impart a knowledge of facts; its secondary object is education in scientific thought, so that the mind may form a judgment on the facts presented to it, and may ascertain new truths for itself. This end, secondary only in time, is first in importance; without it the power of retention is worse than useless, since the mind may become stored with error instead of truth.—*Editorial in The Lancet.*

OBSERVATIONS, INFERENCES, AND EXPERIMENTS.—The first habit I would advise you to cultivate is that of minute and careful observation. When you look into the history of medicine, you will see that all real progress has been made just in proportion as practitioners have founded their opinions on the close observation of disease. So long as they trusted to vague speculations upon pathological phenomena, so long were their theories unsettled and their practice uncertain.

The use of observation is to furnish facts from which conclusions may be drawn; but you must remember that, though your observations may be correct, your inferences may be wrong. Hence arises the necessity for testing them by experiment. In this method of investigation you can vary the conditions under which any particular fact may be observed, and by frequently altering the conditions you can often eliminate from the problem all sources of error, and thus insure the accuracy of your conclusions.

The history of medicine abounds with instances where unaided observations seemed to point at conclusions which subsequent experiments proved to be erroneous.—*Introductory Lecture delivered at London Hospital, by Dr. Samuel Fenwick.*

THEORY AND OBSERVATION.—Some conservative spirits, who take to themselves a title which we all hope in its largest sense to deserve—that of practical men—assume to be superior to all theory, to despise all recent inquiries of almost every kind, and to take observation as their only guide. Observation is, indeed, an excellent teacher; but practical men do not appear to observe more accurately or with a wider scope than others; their distinction lies chiefly in this, that for want of other guidance they are more largely the creatures of tradition. Theory is an idea of purpose which is inseparable from human action; practical men are as much influenced by it as their neighbors—not, indeed, by the rational principles of ripening knowledge, but by the exploded fallacies of the past. To them I would commend a saying which, as having come from the great leader of conservatives, may be entitled to their respect. "A practical man is a man who practices the errors of his predecessors."

If you would advance your art, or even keep level with the age, you must be open to receive knowledge by every avenue; discard no therapeutical suggestion as too chemical; ignore no pathological inquiry, however minute and apparently unpractical, which may throw light upon the nature of disease; do not despise, as new-fangled or superfine, any appliance which may help to make diagnosis exact; separate as well as you can observation from tradition, trust the one and distrust the other.—*Introductory Lecture delivered at St. George's Hospital, by W. Howship Dickinson, M.D.*

THE DENTAL DIPLOMA OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.—It may be remembered that in 1859 the College of Surgeons was empowered, by Royal charter, to institute and hold examinations in dental surgery, and grant certificates of fitness to practice. The college framed certain conditions on which practitioners of dental surgery should be admitted to examination, and one of these was that after September, 1863, no one should be allowed to present himself for examination without proof that he had passed through a certain defined curriculum of study. A considerable number of dentists seized the opportunity of obtaining the license of dental surgery during what we may call the four years of grace, though the number was by no means large when compared with the number of dentists in practice. Since 1863, however, and as the value of the dental license has become more and more appreciated, many have regretted that they neglected the chance of gaining it while they could do so without passing through the curriculum; at last a petition, largely and influentially signed, was presented to the president and council of the college, praying that they would "permit all those whose dental education commenced prior to September, 1859, to present themselves for examination without requiring them to pass through the curriculum, but *not* without subjecting them to a fair yet searching examination." The petition stated that "there are many gentlemen of excellent practice in the provinces, colonies, and elsewhere who would spare no expense, no time, in the acquirement of knowledge by private reading and study, if by such means they could be admitted as candidates for the dental diploma," but who could not afford now to give up practice and enter the ranks of students in London. We congratulate the dental profession on the fact that the council of the college have, after due consideration, granted the prayer of the petition, and have reopened their doors on certain conditions, one of which is "freedom from the 'vulgar vice' of advertising." For this boon the profession is largely indebted to the energy and perseverance of Mr. Charles James Fox, who, we may add, is, like many of the petitioners, a member of the college, as well as a Licentiate of Dental Surgery, and therefore was not personally interested in the matter.—*Medical Times and Gazette.*

REGULATIONS RELATING TO THE DIPLOMA IN DENTAL SURGERY OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.—*Education.*—Candidates are required to produce the following certificates: Of being twenty-one years of age. Of having been engaged during four years in the acquirement of professional knowledge. Of having attended, at a school or schools recognized by this College, not less than one of each of the following courses of lectures, delivered by lecturers recognized by this College, namely: Anatomy, Physiology, Surgery, Medicine, Chemistry, and Materia Medica. Of having attended a second winter course of lectures on Anatomy, or a course of not less than twenty lectures on the Anatomy of the Head and Neck, delivered by lecturers recognized by this College. Of having performed Dissections at a recognized school during not less than nine months. Of having completed a course of Chemical Manipulation, under the superintendence of a teacher or lecturer recognized by this College. Of having attended, at a recognized hospital or hospitals in the United Kingdom, the Practice of Surgery and Clinical Lectures on Surgery during two winter sessions. Of having attended, at a recognized school, two courses of lectures upon each of the following subjects, namely: Dental Anatomy and Physiology (Human and Comparative), Dental Surgery, Dental Mechanics, and one course of lectures on Metallurgy, by lecturers recognized by this College. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of Mechanical Dentistry, under the instruction of a competent practitioner. Of having attended at a recognized dental hospital, or in the dental department of a recognized general hospital, the Practice of Dental Surgery during the period of two years. N.B. The students of the London schools are required to register the above certificates at this College; and special returns will be required from the provincial schools.

Examination.—The examination is partly written and partly oral. The written examination comprises General Anatomy and Physiology, and General Pathology and Surgery, with especial reference to the practice of the dental profession. The oral practical examination comprises the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, etc. Members of the College, in the written examination, will only have to answer those questions set by the section of the Board consisting of persons skilled in dental surgery; and in the oral examination will be examined only by that section. A candidate whose qualifications shall be found insufficient, will be referred back to his studies, and will not be admitted to re-examination within the period of six months, unless the Board shall otherwise determine. Examinations will be held in January and June. The fee for the diploma is ten guineas, over and above any stamp duty.—*The Lancet.*

CONGENITAL MALFORMATIONS OF THE LOWER JAW.—Dr. Alexander Ogston, of Aberdeen, gives, in the *Glasgow Medical Journal* for July, 1874, a complete *résumé* of the various congenital malformations to which the lower jaw is subject, and embodies, in a series of propositions, the conclusions which are warranted by our present knowledge of these deformities. These are as follows:—

1. Congenital deformities of the lower jaw are very rare.
2. Non-development of the lower jaw has been recorded in animals, but never in man.
3. Excessive development of the lower jaw appears to occur, though very rarely, and minutely recorded cases of it do not exist.
4. Preponderance of size of the lower jaw has been observed as the result of deficient development of some of the other facial bones.
5. Congenital smallness of the whole lower jaw occurs, and is generally associated with symmetrical deformities elsewhere.
6. Congenital smallness of the whole lower jaw may lead, in after-life, to acquired deformities of the bones of the cranium and face.
7. Congenital unilateral smallness of the lower jaw has been found in one case with, and in two without, formation of the temporo-maxillary articulation of the same side, and coincided in all with symmetry of the cranium.
8. Congenital dislocation of the lower jaw is said to have been met with in a single imperfectly recorded case.—*The Medical News and Library.*

BUCCAL PSORIASIS.—Dr. Debove contributes to the *Archives Générales*, April, 1874, p. 433, a memoir on this affection, which is not by any means an uncommon one in Paris, though infrequent in this country. Dr. D. does not consider the disease identical with psoriasis as usually found upon the skin, though he retains the name, as more descriptive than that of ichthyosis given by English authors. The appearance of the disease is as follows. It presents itself at first in the form of isolated patches so small as to pass unnoticed. These gradually enlarge, however, and assume an opaline transparent appearance. The epidermic layer of the tongue grows thinner, and allows the mucous layer to become apparent; gradually the patch becomes opaque. If these changed portions of the surface of the tongue are now examined with a lens, the papillæ are seen to be enlarged and frequently massed together with epithelial collections.

The usual form of the eruption is that of a V-shaped median patch, situated at the junction of the middle and anterior third of the dorsum linguæ: it may spread, however, over the whole upper surface, and occasionally to a less degree over the inferior parts. When the disease is well developed, the surface of the tongue feels hard and resistant, and occasionally this induration is so marked over certain circumscribed portions as to embarrass the diagnosis materially. A frequent concomitant or sequel to psoriasis in this locality is cancroid.

As to the diagnosis, it is, M. Debove thinks, not difficult. Should the tongue have been irritated by applications, it may be mistaken for eczema. In this case, careful observation, without treatment, will show the characteristic patches taking once more the place of the artificially-created ulcerations. From indurated chancre the eruption is to be distinguished by the much less marked character of the induration, and by its not being accompanied by those glandular enlargements usually found in connection with lingual chancre. Mucous patches are decidedly different in their appearance from buccal psoriasis. Their surface is covered with the tenacious products of secretion, which, while they have a similar opaline appearance, yet when the secretion is scraped off look quite unlike the epithelial covering of the psoriatic patches.

As regards treatment, M. Debove directs total disuse of tobacco in any form, which he regards as having a certain influence towards the development of cancroid upon the psoriasis. Besides this, he advises alkaline washes and the spray of alkaline mineral waters, as well as their internal use.—*A. V. H., in the Philadelphia Medical Times.*

ACUTE RANULA.—In bringing this subject before the Société de Chirurgie, on June 3d, M. Tillaux observed that there are two forms of the affection met with. In one of these it is chronic, and then it is due, in the author's opinion, to the production of a cyst through the dilatation of one of the numerous excretory ducts of the sublingual gland, due to its obliteration near its orifice in the mucous membrane—a cyst, in fact, due to retention. But this explanation will not serve for the cases in which the ranula is rapidly or almost instantaneously developed. In one case, a man going to bed apparently quite well awoke at three in the morning, with threatening asphyxia, a fluctuating tumour the size of an egg having become developed in the floor of the mouth in that short time. In a second case, a woman, while going down-stairs, found an analogous tumor almost instantaneously appear; and another woman, while sitting by her fire, observed the formation of an enormous liquid tumor in the same place. The fluid these tumors contain resembles saliva in its physical characters, and that is probably its nature, although its chemical examination has only been imperfectly performed. But these tumors, rapidly as they are produced, are not formed by the simple infiltration of liquid into the cellular tissue of the floor of the mouth. They are encysted, having their proper membrane, which may be isolated or excised. The walls of such a cyst could not become organized in a few hours, and the fluid must collect in a pre-existing closed cavity. Some persons explain this occurrence of acute ranula by the obstruction and dilatation of Wharton's duct. But in order for this to take place this duct must be dilatable; and M. Tillaux, in the experiments he has tried of dilating this canal by injecting it with air or water, has never been able to dilate it beyond the size of a crowquill, and that only gradually. When much force is employed, the liquid infiltrates through the canal into the adjoining tissues. The true explanation is to be sought in the fact that in the normal state there is a small closed cavity in the vicinity of Wharton's duct. This was described by Fleischmann, in 1841, and although Sappey and other French anatomists have not found it, M. Tillaux believes it to be if not of constant yet of very frequent occurrence. He proceeded to describe the relationship of this submucous bursa, and showed that Wharton's duct is inclosed within its anterior wall, and is only separated from the closed cavity by a very thin serous membrane. Supposing obstruction of this duct to exist, a communication between the duct and this cavity might be readily and speedily produced by rupture, ulceration, etc., and in all the cases that M. Tillaux has seen there has been such obstruction present. However, as he has always found that the walls of Wharton's duct, although as thin as those of a vein, require very great force to rupture them, he is of opinion that for the production of acute ranula they must have undergone a preliminary alteration.

In the discussion which followed, Prof. Dolbeau observed that, ingenious as this explanation may be, it will not suffice for some cases that have come under his own notice. These have had no connection with obstruction of the duct or with the bursa, and some of them have disappeared as rapidly as they arose. M. Duplay observed that the presence of saliva and the existence of a true cyst, as described by M. Tillaux, are by no means observed in all cases, some of these consisting of a submucous œdema. M. Le Fort did not think that the preparations produced by M. Tillaux demonstrated the existence of the bursa very satisfactorily, and he is inclined to regard it as the result of an *artifice de prêparation.—Medical Times and Gazette.*

Determination of the Age of the Human Embryo by the Evolution of the Teeth.—M. E. Magitot has been occupied in the solution of this problem, so important from a physiological point of view. He has determined that a maxilla or even a fragment of a maxilla may now suffice to fix the age of the embryo. The author gives in a table his conclusions, which we regret to be unable to publish for want of space. In a communication about to be published, the author intends to use the evolution of the dental follicles in determination of the age of the newly-born child.—*La France Médicale.*

Dyspepsia, and its Connection with Decayed Teeth.—Two notes have recently appeared in the *Journal* on Dyspepsia and its connection with decayed or deficient teeth. One writer reminds the profession that imperfect deglutition is one cause of dyspepsia; the other, that functional dysphagia sometimes results from it. Are such notes worth the space they occupy in pages already inadequate to record the original matter forwarded for publication? Is it possible that a practitioner exists who fails to inquire into the state of the digestive organs in his dyspeptic patient? Or is it indeed not generally remembered that the process of digestion begins with the act of mastication? In either of these cases, these notes would be invaluable,—even as revelations; but it is to be hoped that they possess but little novelty for the general body of practitioners. For my own part, in reading the letter dealing with the first named fact, I seem to be informed of something with which I have been acquainted from the earliest period of youth; and, in fact, on turning to Watson's *Practice of Medicine*, there may be found this cause of dyspepsia recognized, and the mechanical remedy indicated.

The note referring to the second symptom of dyspepsia, in speaking of the unsuccessful treatment of the dyspepsia with electricity and bougies, testifies to so blind a regard for symptoms and disregard for causes, as makes one hope that these measures were not taken by qualified practitioners. Perhaps the cases came to the author's hands from homœopathic care, which essentially concerns itself to obviate symptoms.—*J. Ashburton Thompson, in British Medical Journal.*

CURE OF SALIVARY FISTULA.—Dr. Prompt submitted to the examination of the Académie de Médecin, at a recent sitting, a child twelve years of age, on whom he had recently operated for salivary fistula with success. The history of the case was as follows: The patient, while descending a staircase, holding in the hand a *vase de nuit*, had fallen, and one or more fragments of the vessel which had been shattered penetrated the cheek, causing a vertical wound, the superior extremity of which corresponded to the cartilages of the tragus, while the inferior limit was on a level with the median lines of the jaw.

Three days subsequent to the accident, saliva was observed escaping from the wound at a point corresponding to the course of the duct of Steno. Somewhat later, two other salivary fistulæ were found, but, while these latter closed spontaneously, the original one remained patulous. Under these circumstances Dr. P. performed, three weeks subsequent to the date of the accident, an operation, by means of a fine trocar introduced within the buccal cavity, and the new canal thus formed was kept open by tents until it became permanent. The fistulous opening was then closed by sutures, and a complete cure effected. —*Translated from L'Abeille Médicale, for Phila. Medical Times, by A. V. H.*

EXCESSIVE HEMORRHAGE OCCURRING EIGHT HOURS AFTER THE EXTRACTION OF A BICUSPID ROOT.—I forward you the following account of a case of alveolar hemorrhage for insertion in the *British Journal of Dental Science* if you think it likely to be of sufficient interest to your readers.

I was lately consulted by a lady who required some artificial teeth; she was about thirty years of age and of rather delicate health. I advised the removal of several very unhealthy roots, to which she consented; I accordingly extracted the upper left first and second bicuspid roots, leaving three other roots for a subsequent operation. Two days later I removed the upper left lateral and the first and second right bicuspid root; there was slight inflammation of the gum around the first bicuspid; the bleeding immediately after extraction was not excessive or unusual, and it had entirely ceased before the patient left my rooms. However, at about eight P.M., I was sent for and requested to attend immediately, "as the lady's gums were bleeding severely."

I found my patient sitting up, looking very pale and feeling faint from loss of blood; she informed me that, feeling fatigued, she laid down after dinner and fell asleep; she had slept about half an hour, when she awoke with an uncomfortable feeling about her mouth, and was alarmed at finding a quantity of blood on her pillow.

On examining the mouth, I found a severe hemorrhage proceeding from the first right bicuspid cavity. After well syringing the cavity, I filled it with bruised matico-leaf previously moistened with warm water; this remedy proved useless. I next tried the tincture of perchloride of iron, but with no greater success; I then saturated a strip of lint with "styptic colloid" and packed it well into the cavity, keeping it pressed firmly in place; this I repeated a second and a third time after well syringing the cavity; and this also failed: indeed, the blood appeared to flow as freely as at first. It then occurred to me that a stronger preparation of iron might prove more effective. I therefore procured some strong solution of iron (liquor ferri perchloridi fortior of the Pharmacopœia) and applied it in the same manner, and, I was gratified to find, with a very satisfactory result; for, after adding more solution to the exposed portion of the plug, the hemorrhage was entirely checked.

I have found the folia maticæ and styptic colloid very effective in less severe cases.—*Charles James Wallis, Esq., in British Journal of Dental Science.*

THE VALUE OF MATICO IN CASES OF EXCESSIVE HEMORRHAGE AFTER EXTRACTION.—In the interesting report of a case of alveolar hemorrhage by C. J. Wallis, Esq., it is stated that bruised matico leaf previously moistened with warm water proved useless.

There is another mode of using matico, familiar, probably, to some of your readers, which I have hitherto always found successful. After drying the leaf in an oven or before a fire, I rub it in a mortar, and then pass it through a small wire sieve until I obtain a powder somewhat finer than ground linseed. In case of serious or threatened persistent hemorrhage after extraction, I mix a sufficient quantity of this powdered matico with muriated tincture of iron, until a thick paste about the consistency of confection of senna is produced. This I pack into the socket, or apply with a pledget of cotton wool, or the end of the finger, as the source and degree of hemorrhage may require. If blood oozes through the first application, I apply more to the point of leakage. The most severe cases I have seen (and in one there was a pronounced hemorrhagic tendency), by this method have been quickly arrested.—*Edwin Cox, L.D.S., in British Journal of Dental Science.*

TO ARREST HEMORRHAGE OF THE MOUTH AND GUMS.—Take fine flour, a sufficient quantity, and work into it balsam of fir to the consistence of thin, smooth dough. Then take equal parts of powdered kino and catechu, a sufficient quantity, and work it into the dough until it is quite stiff. Roll into masses as large as convenient for introducing into the mouth, and use as many as are necessary to pack the mouth tightly when the patient's mouth is closed, so that every part from which hemorrhage issues may be closely compressed by the medicated mass, to get the mechanical as well as chemical effect of the remedy. Renew the application as often as the mass becomes softened by the saliva, so as to render it ineffectual.

We have used this remedy in the way just described in a number of cases, with complete success, after persulphate and pernitrate of iron, and other more or less vaunted styptics, had failed to serve any good purposes.—*Q. C. Smith, M.D., in Pacific Medical and Surgical Journal.*

A Remedy for Toothache —The following recipe I have prescribed for toothache, and have never found it fail. Should you deem it worthy reproduction in the *Reporter*, please insert it.

℞.—Chloral hydrat., ʒj;
Aqua pura, f℥ss;
Misce, et adde,
Tinct. aconit. rad *Flem.* ♏xv.;
Chloroform. pura,
Ether. sulph., āā ♏xx;
Sp. vini rect., f℥ss.—M.

Ft. mistura.

Sigma. Rub the gums with a little of the mixture; put a few drops upon cotton, and insert in any cavity of the tooth. Also, take the following dose, on sugar: for an adult, fifteen to thirty drops; for a child, two to ten drops, according to age. The above doses can be repeated quite frequently, if necessary.

The remedy suggested by my late college friend, Dr. James Sawyer, may also prove very beneficial, if the dose is lessened, and repeated at shorter intervals of time. Anything to relieve the pain of toothache is very frequently tried; for you are aware that there never was yet the philosopher that could endure the toothache patiently, however at his ease he talked like the gods.—*Dr. C. C. Cranmer, in Medical and Surgical Reporter.*

Toothache Drops.—Dr. Q. C. Smith praises the following most highly (*London Med. Record*): Take of carbolic acid, saturated solution, chloral hydrate, saturated solution, paregoric, fluid extract of aconite, of each an ounce; of oil of peppermint half an ounce; saturate the pledget of cotton or a piece of sponge, and tightly pack in the cavity.—*Phila. Medical Times.*

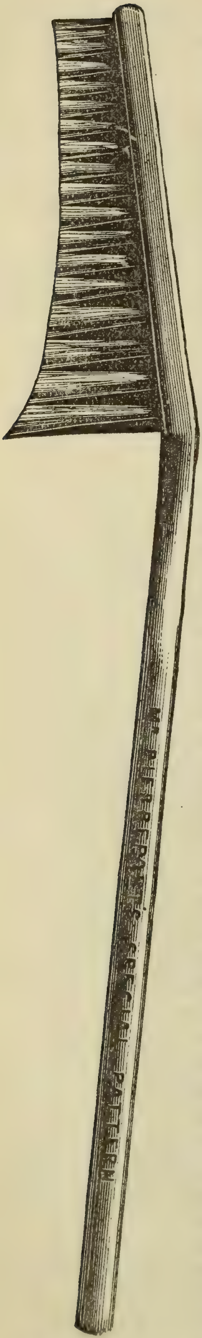
Elegant Ferruginous Preparation (Prof. Goodell).—The following offers simply the most elegant and efficient ferruginous preparation we know of:

Take of tincture of the chloride of iron three fluidrachms, dilute phosphoric acid half a fluidounce, syrup of lemons three fluidounces; mix. A whitish preparation, pleasant to the taste; to be exhibited in a dose of a dessert- to a tablespoonful.—*Phila. Medical Times.*

Formula for Neuralgia.—Dr. Edward C. House recommends the following combination in the treatment of neuralgic affections:

℞.—Zinci phosphide, ʒi;
Ergotin, gr. v.

Divide into sixty pills; one to be taken after each meal.—*Richmond and Louisville Med. Jour.*



A new "Special" Pattern Tooth-brush.—In introducing to the notice of the dental profession an entirely new design of tooth-brush, I shall offer a few remarks in explanation of its differences from, and advantages over, all other tooth brushes at present in use. As may be seen from the accompanying engraving (which represents a full-sized brush), the handle, as well as the shape of the brush, is entirely altered from the general patterns of tooth-brushes, they being usually made with the handle straight or curved, the bristles all arranged of a uniform length, and the rows of one width, or as some of the latter and so-called "improved" patterns, with the longest bristles at the end (*i.e.*, to enter the mouth first). In using brushes of this description, it will be found that the end bristles *bend down*, and so never touch the molar teeth, the reason being that the act of opening the mouth, ready for the introduction of the brush, elongates the muscles of the cheek, and in so doing draws them tightly against the molars, which effectually prevents such brushes passing far enough back into the mouth, and consequently those teeth that require, and it is intended should receive, even *more attention* than the others, escape it altogether. Many dentists recommend a *soft* brush, but I consider that it is perfectly impossible for a soft brush to cleanse the teeth as well as one of hard or medium strength.

It should be borne in mind that tooth-brushes invariably become much softer with use, and patients should therefore be recommended to select a harder brush than is actually required, and so make allowance for the softening which takes place. It will be at once seen, upon comparing an ordinary tooth-brush with the engraving, how totally different they are in every respect. My new "Special" pattern brush is intended to remedy the defects which I have mentioned as pertaining to other brushes. It will be observed that the end bristles are very short, and are narrowed as they approach the end of the brush, which allows them to pass freely between the cheek and molar teeth to the extreme back of the mouth *without bending*, and so obviates the difficulty complained of in ordinary brushes. The slight hollowing out of the bristles enables the brush to lie in close contact with all the teeth, from the canine to the wisdom teeth, and the angle at which the handle is bent throws the end or short bristles against the molars (which it is so desirable should be cleaned) at every movement made by the hand in using the brush. These brushes have now been used by my patients for some time past, and without exception give the greatest satisfaction.

I have named this brush my "Special" pattern, in distinction from another which I designed some years ago, and of which this is a great improvement.—*Evelyn Pierpont, Dentist, in British Journal of Dental Science.*

Another Dentifrice.—In a late number of the *Medical and Surgical Reporter*, I noticed a recommendation of the use of the liquor calcis as a dentifrice. For several months past I have been using a solution of bicarbonate of soda as a dentifrice, with great satisfaction. It effectually cleanses and preserves the teeth and gums, and (as far as my observation goes) does equally as well for artificial teeth.—*N. R. Adams, in Medical and Surgical Reporter.*

An Advance Step for Celluloid.—Celluloid as a material for plates for artificial teeth has been in the hands of the profession for some time, and the success attained has been various, some attaining usually good results, others failing so frequently as, on this account, to discard its use. Continually, from the beginning to the present time, those most interested have been trying to overcome the difficulties, and insure more nearly general success. These efforts have been directed both to the material and the manner of working it.

Such improvements have been recently made in both these directions as to give great encouragement for its future usefulness.

Different and, it is claimed, much better material is now used in its composition than heretofore. The coloring and strength of the material are certainly improvements on the former product.

The manner of manipulation has been greatly simplified, rendered much easier, and far less unpleasant; steam is used instead of oil; all the appliances have been improved. As the material is now presented, there is no scaling or shrinking from the teeth or pins.

In regard to durability, we presume it will be quite satisfactory, and with our present views, we have no hesitancy in saying to all, give it a fair and thorough test.—*Editorial in Dental Register.*

Celluloid.—In the early part of 1870, the Messrs. Hyatt made numerous experiments, the purpose of which was to render more convenient the manipulation of large masses of material, and also to secure desirable qualities which did not exist in the solid collodion obtained by the process patented in 1869—viz., plasticity when heated, and the reduction of inflammability. Among other substances experimented with, camphor was mixed with the cotton. It had been known previously that a solution of camphor in alcohol was a solvent of soluble cotton. It was reasoned, therefore, that camphor might be mixed with the cotton at any stage of the process, and that upon the addition of alcohol the same result would be obtained as when alcohol is previously mixed with the camphor. In the first experiment of mixing the camphor with the wet pulp, while casually squeezing it with the hand, it was found that it compacted and showed signs of combination, although no alcohol had been added. This important discovery was the origin of the present manufacture of celluloid; for it was immediately found upon repeating the experiment that camphor was, under proper conditions, a perfect solvent of soluble cotton. In a very short time after the first experiment a lump of solid celluloid was produced by heating the material to a temperature less than that necessary to melt solid camphor. It was, moreover, found that a perfect chemical combination of the two substances resulted, and the remarkable material now called celluloid was then produced.

The outline of the process now employed in the production of celluloid is as follows: After the pulp is ground in the beater-engine, and the camphor and whatever coloring material may be desired are thoroughly incorporated with it, the substance being kept meanwhile at the proper temperature, the superfluous water is removed by pressure and absorption, a peculiar porous material made specially for the latter purpose being employed. During the process of drying under pressure and absorption, the material becomes nearly converted, so that it is no longer nitro-cellulose, but imperfect celluloid. In so far as conversion has taken place, its properties have undergone a total change. All that remains to convert it into the various articles referred to is manipulation under heat and pressure, during which process the chemical combination is completed. For some qualities of the material desired to be produced, a small percentage of alcohol is added in the subsequent manipulation. As evidence that there is a perfect chemical combination, and not a mere mechanical mixture of the materials, the fact may be stated that, whereas camphor in its uncombined state is an extremely volatile substance when exposed to the air, in its combination with nitro-cellulose it loses this property altogether. An enumeration of the properties of the material which we shall give anon will be further proof of the chemical combination. When the material is properly converted, comparatively no shrinkage takes place. There is no escape of the camphor unless an excess has been employed; and in that case the excess of camphor will escape from the surface of the celluloid, but whatever uncombined camphor remains in the interior is so closely imprisoned by the solid surfaces that it cannot escape. By varying the proportions of the excess of camphor, different degrees of solidity and flexibility are obtained.

The properties of celluloid are as follows: Without the admixture of coloring material, it has a pale amber color. If it is desired to make the material white like ivory, oxide of zinc is used, and for other colors various mineral pigments are incorporated with it, or dyes soluble in alcohol or any of the aniline dyes may be caused to permeate the material to give it any desired color. It is hard and elastic, having a hardness ranging from horn to that of ivory. It is as tough as whalebone. A thin piece, like a paper-folder, may be wound around the finger without breaking, and it will nearly resume its original shape when released. In fact, elasticity is one of the most prominent characteristics of the material. In this respect it greatly exceeds ivory. On this account it would be extremely useful in the construction of apparatus for physical laboratories intended to illustrate the impact of elastic bodies. A ball two inches in diameter placed upon an anvil would require perhaps fifty blows from a heavy blacksmith's hammer to fracture it, and if the anvil and hammer are both polished, not even a scratch or indentation can be found upon the ball previous to its breaking . . . Celluloid is also a very fair non-conductor of heat and electricity—not quite as much so as hard-rubber, but approximating the latter very closely in this particular. . . . While it is so good a non-conductor, it is not perceptibly electric. . . .

But perhaps the most remarkable property of this otherwise very remarkable material is the fact that it becomes plastic at a temperature of from 250° to 300,° and this property enables it to be moulded with facility into a great variety of forms for ornament and utility. Pure celluloid has a specific gravity of about 1.4.

A profitable and successful industry, based upon these properties of celluloid, is the manufacture of dental plates. The material can be made precisely the natural color of the palate and gums. It is much stronger than rubber, and has a perfectly clean surface. It may be manipulated more easily than rubber, as it does not require to be vulcanized. It possesses all the valuable qualities of rubber for dental purposes without its defects. It requires only about one-sixtieth as much vermilion to give the proper color to celluloid as is required to impart the usual color to rubber. The danger of salivation which sometimes occurs in the use of rubber for dental purposes is therefore obviated. The difficulties encountered in the application of celluloid to dental plates have been very great, and many failures were at first experienced, but, with untiring perseverance, the inventors have pursued the subject until, during the last year, they claim to have produced an article possessing all the requirements desired; not a single failure having been experienced through any fault of the material made within a twelve-month past.—*The American Artisan.*

Strengthening Rubber Plates.—Having been accustomed to use platinum gauze for this purpose, the idea of substituting fibrous materials appeared worthy of trial. For this purpose I made a thick solution of rubber in chloroform, and painted it on a number of sheets of strong miller's silk gauze; these were allowed to dry perfectly, and were then made into a compact sheet by pressing a number together with hot rollers, and the sheet thus obtained was cut up and used like ordinary rubber. On testing the pieces after vulcanizing, I found that the temperature necessary had completely destroyed the nature of the fibrous material, the resulting sheet bearing only the same breaking strain as a sheet of pure rubber of the same thickness.

A strong, fibrous material which should stand the vulcanizing process without injury, would be a great improvement, if mixed with the ordinary rubber, and it is possible that further experiments may lead to the discovery of some suitable material.

In suction plates for very flat palates, where there is a difficulty in obtaining sufficient steadiness, I have often found a decided improvement made by striking up a plate of platinum gauze to fit the model, putting it in close contact with the plaster and packing the rubber on the top. The softened rubber penetrates the gauze, which, however, projects slightly where the wires cross each other, causing a peculiar roughened surface, which appears to prevent side motion to a great extent.

A combination of vulcanized rubber and canvas is used for tubing, etc. The temperature required for vulcanizing this class of work is, however, very much lower than that required for hard rubber, and the results in one case are therefore no guide for those in the other.—*Thomas Fletcher, F.C.S., in British Journal of Dental Science.*

Cement for Iron.—A correspondent of the *English Mechanic* says that he has used the following recipe with the greatest success for the cementing of iron railing tops, iron gratings to stoves, etc., and with such effect as to resist the blows of the sledge hammer: Take equal parts of sulphur and white lead with about a sixth of borax, incorporate them so as to form one homogeneous mass. When going to apply it, wet it with strong sulphuric acid, and place a thin layer of it between the two pieces of iron, which should then be pressed together. In five days it will be perfectly dry, all traces of the cement having vanished, and the iron will have the appearance of having been welded together. —*Journal of Applied Chemistry.*

Improved Glycerin Cement.—A cement of great value for many purposes, and capable of being used where resistance to both the action of water and to that of heat is required, is composed by mixing glycerin with dry litharge, so as to constitute a tough paste. For uniting the joints of steam pipes, and other similar applications, this preparation is said to be very satisfactory.—*The Pharmacist.*

Artificial Ivory.—When gypsum is mixed with four per cent. of marshmallow-root, it is said to harden in one hour, so that it can be sawn or turned and made into dice, dominos, etc. With eight per cent. of marshmallow the hardness is increased, so that it can be rolled out into thin plates and painted or polished.—*Journ. of Applied Chemistry.*

Death in a Dentist's Chair.—It is not twelve months since the death of the unfortunate Mrs. Crie, who asked for ether, but was killed by chloroform, administered by Dr. Eastham; but we have already another victim sacrificed to this same idol. Charles Linscott, a strong and healthy brakeman, entered the office of Dr. O. P. Rice, on September 26th, to have a tooth extracted. After some fruitless attempts, the dentist administered chloroform. A witness, who was present a part of the time, said that the deceased asked for ether; Dr. Rice said that he consented to chloroform. There not being enough of the anæsthetic, more was sent for, under which the patient died in the usual way. Dr. Rice rubbed the dying man's face and hands with ammonia, put a little morphia on the tongue, and made some apparently inefficient, certainly ineffectual, attempts at resuscitation. Coroner Ainsworth was called, and ordered an autopsy and an inquest; from the testimony given at which, we have condensed the above account of the death. The autopsy was made by Dr. A. B. Hall. The membranes of the brain were very much congested, as were also the lungs. There were pretty extensive adhesions from an old pleurisy on the right side. The heart was healthy. The abdominal viscera were rather darker than usual, but otherwise normal. The blood was dark and fluid in all parts of the body. Most of the organs emitted an odor similar to that of a cloth on which chloroform had been used an hour or two previously. Drs. George H. Gay, R. M. Hodges, and Norton Folsom gave the oft-repeated testimony to the danger of chloroform and to the safety of ether. The jury found that the chloroform was the cause of death, declared its use to be unjustifiable, and recommended a law to prohibit it.

Here is the same sad story, which has been told so often, again repeated. A healthy man wishes to have a trifling operation painlessly performed; the practitioner wantonly, sometimes in disregard of the request of his patient, uses a dangerous anæsthetic when he might use a safe one, and sends the victim to his account, leaving, often, a family without support. The practitioner knows that this accident has happened to many, and may happen to any one, and that no skill in administration or resuscitation is sure to avert the fatal result; but he has already fifty, one hundred, or a thousand times recklessly endangered the lives intrusted to him without accident; so, confident in his impunity, and exclaiming, with the ungodly, "Tush! none of these things shall happen to me!" he takes the risk once too often. We hold that, in the light of morality, this conduct is criminal, and we hope that the coming Legislature will make it so in the eye of the law.—*Editorial in Boston Medical and Surgical Journal.*

"The University of Philadelphia."—A letter was lately received by the mayor of this city, from Mr. A. M. Hancock, United States Consul at Malaga, Spain, giving information of the sale of diplomas issued by the American University, No. 514 Pine Street, in Spain, by the advertisements of Dr. Van Der Vyver, of Jersey, England. An answer was sent to Mr. Hancock, by chief clerk Marcus, stating that the matter was now in the hands of the Attorney-General of this State, who has applied for a writ of *quo warranto* against the American University.

This so-called University of Philadelphia has been again brought under public notice in an inquest held at Nottingham, England, on the body of a woman named Ellis. A person named John Wilson, calling himself a "Doctor of Medicine, of the University of Philadelphia," had prescribed green hellebore for her, under the idea that she was suffering from erysipelas of the face. As she became worse, Mr. Snell, surgeon, was called in, and found that the patient was suffering from delirium and congestion of the brain, arising from disease of the kidneys. She soon died, and Dr. John Wilson came very near coming to grief himself. —*Medical and Surgical Reporter.*

Caught and Caged.—Prof. John Buchanan, M.D., LL.D., etc., of 514 Pine Street, Philadelphia, was recently arrested and imprisoned for causing an abortion. Whether he has escaped through the large meshes of the law or not, we do not know. Nor do we know whether he is guilty of the particular act charged; but we are certain, that by his imprisonment a good and honorable man is not punished. Until further notice, parties applying to him for diplomas should direct their letters in "care of the sheriff."—*Chicago Medical Times.*

HINTS AND QUERIES.

I find a simple drop tube, held between the fingers of the left hand, a very convenient method of keeping disks and corundum points wet when running them with the engine.—W. C. Eastlack.

Rubber Dam Weights.—The rubber dam weights advertised in the September and October numbers of the Cosmos, should *not* be attached to the "rubber." If they are so attached, most likely the rubber will be drawn away from the tooth enough to admit the saliva, if not enough to let it slip out from under the ligature. The better way is, to have the string of sufficient length, after tying around the tooth, to make a loop of the desired length, and attach the weight to that. It is often desirable to put the string around the tooth twice, not tying it the *first* time around; then the weight attached to the string will continually draw the first turn around the tooth tighter and tighter.—A Hint.

Please give the best method of mending rubber plates with celluloid.—D. S. G.

For the information of your correspondent who asks how to mend rubber plates with celluloid, I answer,—cut a dovetail in the base occupying the space to be supplied with the celluloid, cutting away as much of the rubber as the case will admit of without impairing its strength.

(In cases where the plate is too thin to allow of sufficient depth being cut away to give proper thickness to the celluloid dovetail, drill holes through the plate and counter-sink; the celluloid will flow in and rivet the new piece to the base plate.)

Arrange the tooth or block in position, and place the case in the flask in the same manner as would be done in repairing with rubber. After the flask has been opened, and the dovetailed space cleansed, trim a piece of celluloid to fit this space as near as can be conveniently done, *allowing extra thickness*, so as to have sufficient material to flow into the dovetails and recesses under the teeth or blocks and to fill up the space cut away, so that when it is smoothed down the case shall be restored to its normal contour. Now place this piece of celluloid in position, and bring the sections of the flask together precisely in the manner as directed in making celluloid dentures, and the work is done all but the finishing.

As celluloid and vulcanized rubber will not unite, the new piece or addition in repairing must be held in place by mechanical means; therefore the retaining force will be in the dovetailing and undercut.—W.

FIBROUS TUMOR.—Last April I removed from the mouth of a young lady a fibrous tumor, having its origin from the periodonteal membrane of the left upper first bicuspid. The growth completely enveloped the canine, enfolding the lateral and encroaching upon the central incisor, and interfered seriously with mastication. Three teeth were extracted, the tumor seemingly free from all but the one mentioned, with which it came away nicely. The teeth, though sound, were very irregular; hemorrhage profuse, but soon arrested. The case required no further treatment. Finding that Dr. Garretson mentions but one similar case, of a much smaller growth, and deems it rare, I thought it might be worthy of record.

I notice with surprise, in the September number, that several eminent practitioners highly commend the use of the common pink gutta-percha. That it is durable is quite well known; but, as these gentlemen would admit that it would wear away faster in crown cavities than amalgam, are they also aware that the compound contains the bugbear mercury, as simple tests will show? Would it not be well to consider this before indorsing it so fully?—B. PERCIVAL, JR., D.D.S.

PRESERVATION OF PULPS.—Clean the cavity of all decayed bone, and lay on over the pulp a paste of oxide of zinc mixed with creasote. Make the paste dry and stiff. It will adhere better to the cavity, and not be inclined to come away with the instrument with which it is introduced; besides, the paste will not spread out so much in filling. I frequently place a thick and hard layer of "os artificiel" over the oxide of zinc paste, sometimes filling the cavity half full; then fill with gold. Care should be taken that neither paste comes too near the edge of the cavity, for it would endanger the permanency of the filling.

When I expose, by excavation, a sound pulp, I wait until it is done bleeding; then syringe out with warm water, and apply the paste, and immediately fill.

In excavating a tooth where the pulp has been some little time exposed, I often take off a part of the pulp; then treat as above, and fill immediately. Teeth can be saved with this treatment even when periostitis has set in, superinduced by inflammation of the nerve from exposure.

I do not know that I have killed a half-dozen pulps in three years. My attention was first called to the use of the zinc from a report in the DENTAL COSMOS, in 1872, of remarks by Dr. Wm. H. Atkinson.—MONROE L. PIERCE, *San Francisco.*

TREATMENT OF ALVEOLAR ABSCESS WHEN THERE IS AN OPENING AT THE APEX.—Clean out the nerve channel; then dry it; then inject aromatic sulphuric acid through the foramen. Cotton wound on small broaches can be dipped in the acid and pumped through the foramen, in the absence of a syringe. Seal up the mouth of the pulp cavity with albane, or gutta-percha, and the crown cavity with cotton saturated with sandarac varnish. Let it remain two days. One application is sufficient if enough of the acid reaches the pus-sac; but where the foramen is small, it is better to use the acid twice. Introduce creasote for two days after the acid, if it is convenient for the patient to call again; if not, I fill up the pulp cavity; then crown at once. If there has been sufficient introduced, the abscess will be cured in a few days by destruction of the sac.

This mode of practice was given me by Dr. B. B. Brewer, Sacramento, California.—MONROE L. PIERCE, *San Francisco, California.*

A NARROW ESCAPE.—I came so near an accident the other day, that I am tempted to relate the incident, for fear some brother dentist may be in like situation and not escape so fortunately. I was making a "coralline" plate in the celluloid apparatus, and had just set it "home" sharply when the little cast-iron follower that receives the point of the screw of the press burst, and the pieces, flying just underneath my hand and past my face, flew some twelve feet, and with force enough to penetrate a plastered wall sufficient to stay there.

Had this piece struck my person, the consequences would have been severe if not fatal. If the manufacturers will have these followers made of malleable castings or wrought-iron, there would be no danger; and probably not with cast-iron, if they will make the point of the screw less pointed, so that there will be a larger bearing.

By the way, I have never seen anything about this "coralline" plate in our dental journals. I suppose I have made one hundred of them, and like them much better than the celluloid or rubber. I have never found anything to equal it for plates where the alveolar ridge is prominent.—S. S. BLODGETT, D.D.S.

SOME EXPERIMENTS WITH AMALGAM.—I have always been told that amalgam would shrink, and that it must be used only as a last resort. Recently, my attention has been called to the possibility of its *not* shrinking. About six months ago I made a very large crown-filling in a lower molar as an experiment. It was a dead tooth, and its owner would not pay five dollars to have all of his teeth saved. He came to have one extracted. I told him I would extract it free of charge, if he would let me fill one as an experiment. I selected this dead tooth, thinking it would have to come out soon. I prepared the cavity with but little undercut, and packed my amalgam with a foot-shaped instrument, and with the use of the mallet, as I would pack gold.

I thought the tooth would remain quiet long enough to test the work; and it did. Four months after, I saw my patient again. The tooth had become troublesome, and I extracted it, split it open, and found everything white and clean, with no signs of moisture having penetrated the filling. Since then I have made a series of experiments, by filling glass tubes, about three-eighths of an inch long and one-quarter of an inch in diameter, three-fourths full of amalgam. Two of them I packed in the usual manner, and two with the mallet. After they were completed in the best manner by the different processes, I put them under the magnifying glass, and those which had been packed in the usual way were full of small horizontal openings, showing the work to have been imperfectly done, although I was more careful than I should have been with filling in the mouth.

The malleted filling presented an unbroken surface, and when, some weeks after, I tested them with colored alcohol, my hammered filling stood the test—while the others did not.

From these experiments I learned that we do not manipulate the material enough in filling, and I now claim that it is as difficult to pack amalgam solid as it is gold, as one may become convinced by working it under the glass. It seems to require the jar which the mallet gives to thoroughly condense it.

I use the automatic plugger for amalgam fillings now, with foot-shaped points, and it works well as a condenser, and I know that good and durable fillings can be made in this way. It takes time, but so do all good operations. I am convinced that good amalgam does not shrink a particle, and I wish all who feel interested would make the same experiments. Any amount of pressure may be applied in forcing out the mercury previous to using, but the jar of the automatic plugger will bring more to the surface, which can be removed, and thus there must remain an exceedingly small amount.

When I was with Dr. Westcott, I made a number of experiments under his direction; but the packing was done in the old way, and the result was the old result. He said he had often tried it, but never could get one tight enough to prevent the tincture of red saunders passing around it, so he believed that it shrank. Had he practiced by the aid of a magnifying-glass, he would have discovered where the trouble was. In all operations in the mouth I use glasses which magnify two diameters at a focus of eight inches. However good one's eyesight may be, he will be surprised, when he first uses such glasses, to see how easy it is. Try it.—T. S. HITCHCOCK, M.D.S.

ARSENIOUS ACID.—In the spring of 1865 Mr. John S. called to see me professionally. Upon examination, I found the cutting edges of both the superior and inferior incisors with the cuspids a very little worn away and extremely sensitive to the touch, so that it was with great difficulty and pain he used them. Chloride of zinc seemed to afford the necessary relief, and after an appointment for a future sitting, the patient was dismissed. Before the appointed time, however, Mr. S. returned to me, and, to use his own words, "in agony"; the sensitiveness had returned and greatly increased, so that it was next to impossible for him to bring his teeth in contact with each other. He could not bite into the softest piece of bread, and to the instrument they were as painful as the most sensitive dentine. I at once determined upon the use of arsenic, overcoming the difficulties of application by attaching wax walls to the labial and lingual surfaces of the teeth, applying my paste carefully between the projecting edges of the wax. I kept my patient in this condition for about one hour, when, upon removing wax and paste, I found the sensitiveness had nearly subsided. On the following day I renewed the treatment, and met with complete success. Nine years after the above treatment I saw my patient again, and with not a little anxiety hastened to inquire after his front teeth, and on examination found them as *sound* and as *healthy* as ever; and although the teeth were worn away a little more, this sensitive condition had never recurred.

Now "arsenic" is not a hobby with me; I prefer *not* to use it, and avoid it on all possible occasions, making it a "*last resort.*" I cite this particular case from having observed it stated in one of the recent dental journals, by a much respected and very eminent member of our profession, that the evils attending arsenic were sometimes not developed "until two, or even as late as five, years after its application." When this is the case, is it not from a careless use of it? Arsenic is an invaluable remedy in the hands of a skillful physician. Atropia, a poison equally dangerous and as deadly, is the means through which the oculist not only arrives at his diagnosis, but frequently perfects his cure. May not arsenic, in the hands of a skillful and careful dental operator, take its proper place among dental remedies? I am conscious of the evils that may arise from the poison, and have seen most unfortunate results from its use, but am convinced these have followed the careless and improper application of this powerfully corrosive agent. Ten years, however, is a very good test indeed, and from all present appearances both patient and teeth referred to certainly look good for ten years yet to come! May I ask those who so decidedly denounce arsenic and deprecate its use on *all* occasions, in what better way could this case have been treated?—WM. C. EASTLACKE, D.D.S., *Berlin, Prussia.*

DEAFNESS CURED BY THE EXTRACTION OF TEETH.—Mrs. A., aged about thirty-eight years, presented herself at my office about five months ago for the purpose of having all the superior teeth in her mouth extracted, for the purpose of obtaining an artificial plate. The teeth, seven in number, were extracted in the following order: right second molar, right second bicuspid, four incisors, and left canine. Immediately after the removal of the canine tooth, the patient remarked that she could hear now from her left ear. She had been *entirely* destitute of hearing in that ear for upwards of three years, having lost the faculty while attending church one Sabbath morning. While sitting in church she said she had felt a severe pain in the abdomen, thence passing up her left side to her face and ear, which lasted about ten minutes, and from that time she had been entirely deaf in that ear. She said that after the removal of the canine tooth a sensation followed like a current of air passing in at her ear, which lasted several moments; immediately afterwards she recovered her hearing. Upon examination of the teeth, I found them much decayed, and all affected with "alveolar abscess," especially the right molar and incisor teeth,—the bicuspid and eye-tooth not so much. I have frequently seen the patient since, and her hearing continues good.—LUTHER CAMPBELL.

NECROSIS AND LOSS OF ALVEOLI FROM USE OF ARSENIOUS ACID.—Mr. S., aged forty, apparently healthy, but with superabundance of adipose tissue, presented for treatment of caries in approximal surfaces of first and second superior molars, right side, in May, 1873.

On examination, I found cavities close to the gum, hard to approach, and an exposed nerve to treat; applied arsenious acid in usual way, sealing with cotton and sandarac. Subsequently filled both cavities with amalgam. After the lapse of a few weeks patient returned, complaining of uneasiness in the teeth and soreness of the gums. Found the gums between the teeth ulcerating and sloughing, and filled with food in a putrescent state. Washed away the foul accumulation, and applied glycerole of thymol at two different sittings, and heard no more of the case till July, 1874, when the patient called for a new operation, and said that the teeth had troubled him more or less ever since the filling till a few weeks previously, when a piece of bone came out from between the teeth, since which time no further trouble had been experienced. I was a good deal surprised, and quite incredulous, to hear of bone coming out from filling of teeth, but on examination found, sure enough, that the entire alveolar septum between the two molars had come away, leaving a wide space between the teeth.

The *supposition* is that, owing to the cavity being close to or under the margin of the gum, and the difficulty of seeing in making the application, that a portion of the arsenic was forced down on the process, and was there retained till it had the effect of bringing about necrosis. This is the first and only case of the kind occurring in my practice.—W. S. R.

An Experience in Capping Pulps.—With a desire to contribute my mite to the general fund of useful knowledge on this important subject, I have thought proper to submit my experience with the process of capping pulps as suggested by Dr. James S. King, in the Dental Cosmos, page 193, April, 1872, and pages 389 and 390, July, 1873.

I have always felt in honor and duty bound to test every method suggested that seemed at all reasonable for compassing this most desirable end, but must honestly confess that, with very few exceptions, my efforts have proved futile.

With oxychloride of zinc, which has been so constantly and highly lauded, I have been more unfortunate than with any other of the popular materials. The pain produced by its application is so severe, in most cases, that its immediate removal is demanded, and, when tolerated in contact with the tissue, the result has generally been the death of the pulp, and alveolar abscess. With Hill's stopping I have had some success in protecting and saving nearly exposed pulps where there was a thin septum of dentine left dead or otherwise, but I could never induce this intractable organ to tolerate the material in immediate and absolute contact with its denuded surface.

With my repeated mortifying failures and disappointments, I had well-nigh despaired of success in saving the vitality of the pulp when fully exposed, when this happy suggestion reached me through your chief of journals. It impressed me favorably at once, and I determined to give it a fair trial; and I feel amply repaid for my trouble, as it has proved a most gratifying success,—far surpassing my most sanguine expectations. In fact, in consideration of the virtue it has displayed in my experience, I feel that I can hardly say enough in its favor, as it has enabled me to abandon, to a great extent at least, an operation which I always regarded as radically wrong, if not barbarous, and to substitute a permanent benefit for an absolute injury. My manner of using it is not essentially different from that of the author; but I am in the habit of covering the part composed of white oxide of zinc and creasote with a small piece of gold foil, in order to exhibit its position more perfectly, and prevent its displacement when introducing the subsequent filling. In more than fifty cases where I have used it (and some are of more than a year's standing), but one has failed, and that was when the nerve had been exposed for a long time, and had been the source of much trouble. One agreeable feature in relation to it is that its use is attended with very little pain, never producing those contortions of countenance that take place under the oxychloride treatment.

I have pursued the course of the healed leper in making known my success with this material wherever opportunity presented, and if you deem it of sufficient importance to give it a place in your department of Hints and Queries, I shall feel amply repaid for my trouble.—J. W. Plummer.

Observations and Notes.—The observations of the writer during several years' practice in this city, and notes pertaining to the relative success or failure of operations performed by leading dental operators, will be given in this article.

It may be remarked, that a more favorable city for observation than Denver cannot be selected. Here the debilitated and the robust from every class of society, and from every section of the land, are met.

Many, before coming to Colorado, have their work "done up;" but a large number of them have occasion, at an early day after their arrival, to call upon a resident dentist, for quite often they find that operations which are a seeming success at their homes, are failures when submitted to the test of altitude. Denver is a little upwards of a mile above the sea level.

The writer has carefully and critically examined the gold and other fillings from the hands of many of the reputed best operators in New York, Boston, Philadelphia, Buffalo, Baltimore, Washington, Pittsburg, Cleveland, Columbus, Cincinnati, Chicago, St. Louis, Detroit, New Orleans, San Francisco, and almost every city of forty thousand and upward population in the United States. The result is surprising.

The fillings of at least five professors in dental colleges were failures; not a single perfect filling could be found from their hands, while work from several previously unheard-of operators was exquisite in every sense of the word.

The operations of those who, as their patients remarked, "used the rubber dam a great deal," were infinitely better than the work of those who told their patients "they could do just as good work without it."

The writer has not found more than one in twenty proximal fillings that were perfect when filled *without* the *rubber dam.* This applies to work from the reputed best operators in the profession.

Thirty per cent. of the crown fillings in the upper bicuspids and molars were defective, and over sixty per cent. of crown fillings in lower bicuspids and molars were in the same condition. In incisors and canines at least sixty-five per cent. were imperfect. Unskillfulness in filling this class of cavities was very marked. Of teeth that were "built up,"—restored by gold,—three-fourths of the operations, from their history, were failures in four years or less.

The writer would not assert that these notes are at all conclusive as to the ability of the operators or to the percentage of failures; far from it. A much greater number must be examined even to approximate a correct estimate as to the success of the best American dentists.

Other notes may be of interest. Nearly all the perfect proximal fillings were attended *with wide separations*, or with a *side* V-shape separation. This is particularly valuable to note: the best of the distal proximal fillings in molars and bicuspids were made after separating by cutting the buccal surface away more than the lingual surface, thus leaving the point of the V to the lingual surface.

In proximal fillings, the cervical wall nearly always was the first to fail.

From these observations, I am led to believe this side V method of separating has superior merit. One point is certain,—teeth should be so separated that they can be thoroughly cleansed and properly filled, and so that the patient can remove food from between them without difficulty.

In incisor and canine cavities, from the very large percentage of failures in this class of operations, the writer is very favorably inclined to return to the favorite method of Prof. Harris, to make a V separation from the lingual to the labial surfaces of these teeth. One proof of the utility of such separations is evident: *i.e.*, it makes the teeth almost self-cleansing, and food between them is not tolerated.

The question is,—*what makes such a large percentage of dental operations from qualified operators comparative failures?* It would appear that the character of the gold used must have something to do with it. That the adhesive quality of gold has been much abused, and sometimes destroyed, *by over-malleting*, no one can deny; and in my judgment, at least, gold is as often ruined *by over-heating.*

A remark of Dr. Butler, before a dental society (it was published in a recent number of the DENTAL COSMOS), just expressed my idea of working gold.

Seven years since, I ceased the constant use of purely adhesive gold. I use foil only. I use it in its semi-adhesive condition largely, by annealing it *over* a flame of alcohol, never *through* it. Placing a *little* alcohol in a saucer and lighting it, assists in annealing a large quantity quickly. Any one who has been accustomed to using gold annealed through the flame, will be delighted to experience a relief from its stiffness, and enjoy a kid glove, lead-like working by annealing the foil *over* the flame. It is obvious that stiff, intractable gold can be driven into the inequalities of a cavity only at the expense of its cohesive property.

Over-malleting is one of the evils of the practice of to-day. No more two hundred and seventy or three hundred and eighty blows of a steel or tin mallet on a pellet of gold in my practice. The chances are that one hundred blows on a pellet of gold will very greatly injure if not altogether destroy its cohesiveness; and although a subsequent pellet of gold may appear to cohere, it will only *appear* to, for sooner or later it will flake off, or the filling will disunite and become pervious, and although it may seem to be intact, it really is leaking.

Many who read this article will ask, "What do you mean by failure?" I reply, a filling which drops out; or when there is a recommencement of decay around the filling or at the cervical wall; broken-down margins, "flaked" surfaces, discoloration about the filling, decay at any margin, or "cracks in the enamel;" too frequently, I fear, the result of the injudicious use of a square-edge hoe excavator, or the careless use of the mallet.

I have had a strong inclination to publish a roll of honor, of the names of the most successful operators living whose operations have been thoroughly examined in this city, but a sense of duty forbids it. I wish, however, to place a flower upon the tomb of one who is sleeping. A lady patient of mine, in this city, has a gold filling in the distal surface of the left lower second bicuspid, placed there by the late Dr. Westcott, of Syracuse, New York, *thirty-six years ago!* The filling has the appearance of adhesive gold, is very smooth, *and is perfect.*—ROSCOE C. MOWBRAY, M.D., D.D.S., *Denver*, *Colorado*.

CHILDREN AS PATIENTS.—One of the most important duties that the dental practitioner has to perform is, to preserve as far as possible the teeth of children; for, when we take into consideration how essential they are to physical development, and how, when allowed to decay and be lost prematurely, the little ones suffer from inability to comminute their food, it is obvious that it is dangerous to neglect them. Doubtless a large number of confirmed dyspeptics received their tendencies to this dreaded malady in early childhood, from the premature loss of their teeth. If the deciduous teeth are lost before the eruption of a sufficient number of the permanent ones, thus obliging the child to swallow its food without mastication, the stomach is called upon to do more than its share of work. It is very shortly so greatly weakened that it cannot perform its functions properly, and the whole system is affected in consequence.

This systemic disorder is one of the most serious evils that results from neglecting the first teeth; but the suffering caused by their early decay is not to be unheeded,—the sleepless nights and days of almost ceaseless worriment. A general opinion seems to prevail among medical practitioners, as well as among parents, that children need not visit the dentist until the permanent teeth have made their appearance. Physicians usually advise the extraction of the deciduous teeth when troublesome, which advice generally proves to be more detrimental to the child than is the disorder superinduced by caries. The first molars are too valuable to be sacrificed simply on account of caries, for the pain can be alleviated in a few moments, and the usefulness of the teeth restored.

It too often happens that the deciduous molars are lost before the incisors of the permanent set are erupted, and even before the appearance of the first permanent molars. This is to be regretted, and should never be allowed to occur if by any possibility it can be averted. The greatest difficulty that the dentist has to contend with to prevent this occurrence is the neglect of parents to have the mouths of their children attended to before this condition is reached; yet much can be done to prevent it, if the troubles consequent upon neglect are made apparent to parents. They will, in the majority of cases, follow directions when appreciated.

When should children visit the family dentist? At the age of two and a half or three years we may expect to find caries in their teeth, for civilization has made many inroads upon the generation; and hereditary transmission of frail, delicately-formed teeth is the rule nowadays, and not the exception. When such is the case, every precaution should be taken to check the caries, even if very slight, at once. Every dental practitioner should regard it as his prerogative to advise parents about their children's diet, and inform them of the food containing the necessary elements for the sustenance of the osseous system. This is no secondary matter, and it cannot be too earnestly emphasized, for proper food is in many instances a better preventive of decay of the teeth than skillful dental and medical treatment combined.

When little ones are brought into the office for the first time, they are usually timid, and in order to secure their confidence it is well to incline them to think of dental operations as simple, by rubbing their teeth with a soft stick for a few moments, and let this suffice for the first "sitting." This will secure their good opinion, which is an essential point; for, if they are *hurt* on their first visit, they will not care to renew the acquaintance; for first impressions are generally lasting with children; and if they form an unfavorable opinion of the dentist, they will be found the most provoking patients to operate for. Getting into their good graces is almost half of the work to be accomplished.

As it is necessary to make a short "sitting" for a child, the process of preparing cavities in their teeth should be done as expeditiously as possible. Nothing serves a better purpose to enable one to do this than the burring-engine. In careful hands, and with sharp instruments, less pain is inflicted, and greater thoroughness obtained than by any other method. It must be used very gently, however.

The materials used for filling the class of teeth under consideration are: tin, amalgam, oxychloride of zinc, and gutta-percha.

In the back teeth with living pulps, and in which the cavities are not too large, tin foil is the best. Cut it in strips half an inch wide, or wider, according to the size of the cavity, and fold it into a ribbon of four thicknesses, making it about an eighth of an inch wide and four inches long,—the length of the sheet before cutting. With the pliers the end of the strip is placed in the cavity, and the pressure applied towards the walls. When it is full, the mallet can be used with a small point to relieve the uneven surface. Then burnish well.

It is preferable to keep the cavity dry, if possible, while packing, but owing to the great softness and malleability of the tin, the moisture will be sufficiently pressed out, and the adaptation of the metal will be accurate enough to the walls of the cavity to insure success, even if the filling gets damp. Another advantage in a tin filling is, that it is not as good a conductor as amalgam; and when the dentine is sensitive there will be less trouble from sensations produced by therma, changes, momentary twinges,—as when taking a draught of water, etc. When a good conducting medium is placed against a tender surface, it is often the means of causing considerable trouble, for the dentine is so vascular in the deciduous teeth, that the pulp is frequently destroyed by the repetition of shocks.

It must be borne in mind that the density of the dentine is not as great in these teeth as it is in the teeth of older persons, and this fact requires extreme care and good judgment in the selection and management of the material employed for the suppression of caries in them.

Amalgam has many desirable qualities as a filling. When a child is nervous and impatient, and it is difficult to keep it quiet long enough to use the tin, this preparation is better than any other for cavities in the crowns, and on the proximate surfaces of the back teeth. One precaution, however, should always be taken when it is used, and that is to thoroughly line the bottom of the cavity to be filled with a thin layer of gutta-percha, after having bathed it with carbolic acid. This should be done also when tin is used, where the decay has made considerable progress. More pulps are destroyed by the injudicious use of these metals, and by the use of oxychloride, than by all other sources combined, excepting, of course, the solvent action of acid.

The amalgam should be mixed into a stiff paste, and thoroughly rubbed in a mortar. It is not necessary to wash it, as a better result is obtained by using it perfectly dry. If it is a little too hard while filling, warm the instrument, and the facility with which it can be manipulated is very gratifying.

The various preparations of oxychloride of zinc are essentially the same in regard to their effect on living tooth-structure. As a filling for children's teeth, it is objectionable except in cases where the pulps are dead.

In small cavities the pain produced by this material is almost beyond endurance by children, and you cannot explain to them why this is occasioned with sufficient clearness to warrant their tolerating it. If the material is used in large cavities in which the pulps are alive, the escharotic properties of the chloride will almost invariably destroy these delicate organs.

On account of its antiseptic qualities, many advantages accrue from its use in filling pulpless teeth, among which may be mentioned the diminution of the risk of periodontitis and alveolar abscess, and the fracture of thin walls; also its rapid and easy manipulation. The writer uses it exclusively in filling pulp cavities, and the roots in the deciduous teeth,—not believing in the theory held by many that absorption of the roots of these teeth takes place to any considerable extent after devitalization of the pulp. The fillings of this material should be kept dry as long as possible,—not less than twenty minutes,—if they are to be permanent. Melting a little wax over them with a heated instrument will accomplish this end.

Gutta-percha is undoubtedly the most freely used of any of the materials spoken of for filling children's teeth. When warmed, it is very plastic, and can be worked with great rapidity, which renders it a most valuable material. It is free from any injurious influence, and produces less pain in cases of sensitive dentine than any other material now in use. For the incisors and canines, and for temporary fillings in the back teeth, it surpasses all other materials; but on account of its being so easily worn out by attrition, it cannot be relied on as a permanent stopping. In order to avoid refilling cavities on the masticating surfaces of the molars, it is better to line them with the gutta-percha and fill permanently with either of the metals alluded to. Better results will be obtained, and greater satisfaction will be derived from this course of treatment.

Soft gold can be successfully used for these teeth, but it is not as reliable as tin foil.—EDWARD H. RAYMOND, D.D.S.

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BY ROBERT ARTHUR, M.D., PRESIDENT.

GENTLEMEN:—I propose to occupy your attention to-day with some views of the present status of the dental profession in this country, and with some considerations looking toward the advancement of its interests.

You are aware that in the past quarter of a century great advances have been made in practical dentistry. Materials, instruments, and appliances of very beautiful character have been introduced, and have been improved, and are being continually improved in a most remarkable manner. These inventions and improvements, as you are aware, have facilitated the requisite manipulations to such a degree that the number of "good operators" has greatly increased. But the question has frequently been asked, whether the attention of dentists has not, in this country, been devoted to the practical features of their profession too exclusively, to the neglect of higher considerations. We are claiming that dentistry is a specialty of the great art of medicine, and it is desirable, at this time, to enter upon the inquiry as to how far we are justified in making such a claim.

Medical men, who are supposed to be best able to place a correct estimate upon its justice, refuse, in this country, to allow this claim. They regard dentistry as a merely mechanical occupation, although admitting that a great deal of ingenuity is exercised, and manipulative and even artistic skill exhibited by dentists in the pursuit of their calling. But so lightly do they regard the whole subject of diseases of the teeth, and those to which they not unfrequently give rise, that they seem to consider no special study necessary for their comprehension, and assume to know more, as a result of their general medical studies, of these diseases than the best class of dentists.

Several editorial articles have recently appeared in the *Medical Times* of Philadelphia which I believe to afford a fair exhibit of the estimate by the medical profession of what its members understand by "Dentistry." I do not propose on this occasion to review these articles, but will give from one of them an extract, which will furnish me with a basis for the remarks I propose to make. The writer says,—

"Argue and reason as we will, laud dentistry to the skies, or degrade it to the lowest rank, the fact remains, that the great bulk of the work to be done is purely mechanical; that whilst a few practitioners, like our friend Dr. Garretson, may climb from tooth-pulling and tooth-plugging, to the performance of the most serious operations, involving life itself,—from being skillful dentists to being as skillful surgeons,—the great bulk of the profession must spend their lives in the monotonous round of purely mechanical labor, in which mechanical and artistic skill, along with personal qualities, are the sole guarantees of success.

"The higher education, the wider culture of the physician, although it may contribute, is in no case a necessity to such success, and just so long as this is true will a very large proportion of dentists neglect that culture, which, while it may be an ornament, is not a necessity, for the practice of their profession. Here, it seems, the matter rests. Dentists —we mean the general mass—have at present no claim to be recognized as representatives of a branch of our profession. Many dentists are doctors; some of them 'oral surgeons,' and as such we receive them into the brotherhood; but the great mass must probably remain, as they are at present, dentists, worthy citizens,—we do them no disrespect,—artists of ability many of them, but yet in no sense practitioners of medicine; in no sense entitled to recognition as such.

"The professions of dentistry and medicine may be conjoined in one person, but they are essentially distinct, and a man may assuredly be an excellent dentist without being a doctor, or an excellent doctor without being a dentist."

Let us, in the first place, inquire to what extent dentistry occupies the position to which it is thus assigned.

It is estimated that there are at present, in this country, some ten or twelve thousand men engaged in the business of dentistry. What is this large number of men doing? What is their daily occupation? It consists, almost exclusively, of "plugging," and extracting carious and, by no means unfrequently, sound teeth and inserting artificial teeth. This routine constitutes, to a great extent, the practice of dentistry at the present day. This statement you must concede to be correct. What kind of knowledge, it may well be asked, of the general principles of medicine is necessary to make (in the above sense) a dentist? No knowledge of anatomy, physiology, or pathology is required to fit an individual to render the services indicated. For many of the simpler operations in the way of filling teeth but little mechanical ability is required, and even for those of more difficult character, a certain amount of manual dexterity, patience, perseverance, and careful attention to details will go far toward accomplishing the best results. This is especially the case at the present time, as improvements in appliances and materials greatly lessen the difficulties formerly encountered.

The extraction of teeth does not require, as was formerly supposed, any knowledge even of the anatomy of the parts concerned. There is very little risk of "breaking the jaw," as has been popularly supposed to be likely to happen in the hands of an unskillful operator. The alveolar processes may be broken away, with the teeth, with almost entire impunity; not without greater or less mutilation, it is true, but without any other injury.

The branch of mechanical dentistry has in a great measure, except in the hands of a small number, been degraded to a mere trade, requiring less skill or knowledge than the most humble mechanical pursuits.

I do not overlook the fact, that so far as the mere manipulations of dentistry are concerned, there are many operations demanding a high degree not only of manual dexterity, but of thoughtful ingenuity. These I need not indicate to you. But even the highest features of mere operative dentistry do not call for any acquaintance with medical science. I have known, and you have known, men who have acquired the reputation of superior operators who were very ignorant men, not only of medical science, but very deficient in ordinary intelligence. They were merely skillful manipulators.

Now, if dentistry does not mean something more than this, no matter how admirably and with what perfection the required operations may be performed, it certainly has no claim to a position as a medical specialty. It must be conceded, in this view of the subject, that the statements of the editor of the *Medical Times* are so far correct. Persons who have no higher qualifications than those stated may be, as the writer quoted says, "Dentists, worthy citizens, artists many of them, but yet in no sense practitioners of medicine; in no sense entitled to recognition as such."

I do not see how this position is assailable or can be made a subject of complaint. There is some discourtesy in the language and spirit of some portions of these articles; but who can be surprised at the impatience and irritation which medical men exhibit on hearing persons called "Doctor," who are ignorant of the rudiments of medicine, who, indeed, are often so illiterate as to be unable to write a simple English sentence correctly?

But dentistry, as it is too commonly practiced,—dentistry as it is represented by a great number of men ignorant and incompetent, except so far as their ability extends to render the most simple services,—

does not constitute the science and art of dentistry itself. While the better men engaged in this pursuit are dragged down in public estimation to a level with such persons as those to whom I have referred, they take broader and more elevated views of their calling. To them it is a pursuit invested with a degree of dignity based upon the important interest of humanity, with which it is concerned, that leads them to labor earnestly for its improvement and advancement, and to contend on all proper occasions for the recognition of its just claims.

They have no hesitation, therefore, in declaring that the writer quoted and those he represents are mistaken in their views, so far as they take the men who are now engaged in rendering the simplest services as exponents of the true character of dentistry itself. And further, if they were themselves acquainted with the real scope of dentistry, they would not be disposed, as they now appear to be, to degrade it from its true position. I hope to be able to show, when the subject is properly understood, that a dentist, by becoming a doctor of medicine, will be a better dentist, and that a physician, if he become to some extent acquainted with dentistry, will be a better physician.

In what respect, then, let us now inquire, does dentistry deserve to rank as a medical specialty?

1st. It is concerned with the care of important parts of the organism, more subject than any others to morbid conditions, which are commonly attended with severe suffering, and which are not unfrequently of grave character.

2d. Disorders coming strictly within the province of dentistry are not always confined to the teeth, nor to important parts adjacent to them, but in many cases distant parts, and even the whole system, become involved, giving rise to severe suffering and even to the abridgment of life. On the other hand, certain abnormal conditions of the general system seriously interfere with the development, and subsequently impair the condition, of the teeth.

3d. So far as general disorder is caused by the teeth, the morbid conditions of the latter and the influence exerted by them upon the system require special attention and study. The influence of abnormal conditions of the general system upon the teeth cannot be understood without an extended acquaintance with the general principles of medicine.

That this is no over-statement of the scope of dentistry a very brief examination in detail of some of its higher requirements will show.

What are the teeth?

An ordinary examination of the human teeth presents them to us as hard bodies occupying a conspicuous place in the mouth, and subserving the uses of seizing, dividing, and comminuting such aliments as are subjected to their action. They perform an important function in the animal economy, and their preservation is of great importance; but they are not essential to life, or as important as any of the organs of the senses. One or more, or all of them, may be violently torn from their places without jeopardy to life. Their places may be more readily supplied with artificial substitutes than any other part of the body. Yet when we come to consider the teeth more closely, we find that they are not only parts of the animal organism, but in union with it in a most intimate manner. They present a very curious gradation from a highly-vitalized tissue to one apparently devoid of vitality. The problem of maintaining life in the crowns of the teeth, deprived of the covering of vascular tissue common to the bones, is beautifully solved. In each one of the teeth nerves and arteries are sent into a body in the center of the crown, from which are thrown out through the tubuli of the dentine fibrils endowed with all the elements of vitality. In these fibrils the function of nutrition goes steadily on, and the effete matters which result from this act are taken up by absorbents and veins and carried back into the general circulation. From this dental pulp, or the cavity which contains it, myriads of tubuli run out to and somewhat into the covering of enamel. On the internal layer of enamel, some of the tubuli terminate and enlarge in the form of cells, and possibly, through their contents, effect, in a manner the exact nature of which cannot be made out,—even with the great aids to human vision now employed,—the union between the vital dentine and the dead enamel.

But when we come to look for the sources whence the teeth derive their vitality, where do we trace them? To the very centers of life. To the heart and to the great centers of the nervous system. The nerve-fibrils in the most external portions of the dentine are parts of a great system of nerves coming directly from the brain, giving sensibility to all parts of the face, supplying the tongue with the special sense of taste, and affording the power of motion to the lower jaw. When the very surface of the dentine nearest to the enamel is cut or roughly abraded, after it has been deprived of enamel for a short time, the whole frame thrills with pain. In order to understand these relations of the teeth to the rest of the system, it is obvious that a general knowledge of the vascular and nervous systems must be obtained. Without this knowledge the dental system and the nature of its relations to the general system cannot of course be understood. This may all be very well, it is said, as a matter of interesting study to a dentist, but is not essential to the successful practice of his art.

Let us examine this position.

There would be no necessity for the art of dentistry, even admitting it to be nothing more, if the teeth were not subject to disease. We find that in civilized communities the teeth very commonly undergo a process of decomposition by which they are rapidly destroyed. Whatever the real nature of this process may be, and whatever the agencies are which effect it, it is an axiom in medicine that an important if not an essential feature of the successful treatment of disease is a clear comprehension of its nature and character; and the first step in this direction is to obtain an intimate knowledge in a broad sense of the anatomy and physiology of the parts involved.

When we come to the consideration of this process of decomposition of the teeth which we term dental caries, we find, in taking the first steps, that the field of inquiry assumes large proportions.

What is dental caries?

This is a question that has been asked for many years, and has tasked the best intellects, and those of no inferior order, which have been attracted to its consideration, but has not been satisfactorily answered. It is true that it is generally agreed at the present day that dental caries (a term not entirely satisfactory) is the result of a chemical decomposition of the substances of which the teeth are composed. There are strong reasons for believing that the active agent is acid in its character, and is capable of entering into combination more or less rapidly with the phosphate of lime, of which the teeth are principally made up. But when we come to inquire into the nature and origin of this acid agent, we find it necessary to push our investigations so deeply as to require the aid of chemistry and general and special pathology.

Is this agent produced by the decomposition of fragments of aliments taken into the mouth, or is it to be found in the natural secretions in a normal or morbid condition? Or is it to be attributed to the agency of animalcules or vegetable growths commonly found in the mouth and attached to the teeth?

These are problems the solution of which requires extended knowledge and research, and their importance in reference to the arrest or prevention of dental caries, so widely prevalent and so destructive at the present day, and increasing in prevalence and destructiveness with every generation, cannot be overestimated.

They have not yet been solved.

It is found that great differences exist in the structure of the teeth of different individuals. Apparently, the tendency to caries is greater (independently of the character of agents acting upon the teeth) in some persons than in others. We speak of teeth naturally frail, readily destroyed, soft in structure, and readily acted upon by acid or other agents capable of decomposing them, that may be present in the mouth; of others so hard and flint-like that, if attacked by caries, they yield slowly to its destructive influence. This feature of the inquiry is one which has led to a great deal of thoughtful investigation.

It has been supposed that deficiencies in the structure of the hard parts of the teeth are to be attributed to a deficiency in the pabulum necessary to supply the lime salts to the teeth, and that if lime were administered to children, or to mothers nursing infants, the deficiency of the lime required to give density to the teeth would be supplied. I have no opinion to offer at present upon this subject, but only state the fact that such an inquiry has attracted a great deal of very earnest attention.

It is a matter of observation, too, that without regard to the character of their structure, caries progresses more rapidly in the teeth of some persons than in those of others. This probably depends upon constitutional influences modifying the character of the buccal secretions. These influences may depend upon accidental or transitory conditions of the general health, or they may be hereditary, and it becomes important to inquire whether and by what means they may be modified.

I can, of course, only glance at these phases of the subject, and merely for the purpose of indicating very faintly the extent of the field of study which opens itself, even when the simpler features of dentistry are considered.

The treatment of dental caries in its earlier stages is, it must be admitted, merely mechanical. The principle of treatment looks to the prevention of the accumulation and retention of particles of food and of the secretions of the mouth upon certain portions of the surfaces of the teeth. Filling carious cavities with some indestructible substance has no other object, as you are of course aware, than the obliteration of solutions of continuity resulting from caries. It is evident that no knowledge of anatomy or of the general principles of medicine is necessary to effect this object. A skillful manipulator will accomplish more in this way than the most learned physican. The fact is (and I would beg you carefully to consider this phase of the subject under consideration), that the necessity for the splendid operations which are sometimes performed results from neglect of the proper timely treatment by means of which caries may be arrested in its incipient stages or prevented altogether, thus rendering such operations unnecessary. And the failure on the part of some of these "pluggers of teeth" to discover, or even to comprehend when brought to their attention, means far more efficient than those they have relied upon for the arrest or prevention of this destructive disease, can be attributed only to a lack of that broad culture which the most efficient practice of dentistry demands.

But the treatment of dental caries is not always confined to these simple elements. In the progress of the disease, if not arrested, the dental pulp is eventually exposed.

The dental pulp, as you are aware, is a peculiar body; it is very highly organized, and so perfectly protected in the position it naturally occupies that it appears to have no power of withstanding the morbid influences of agents which do not injuriously affect any of the other exposed vital tissues. The contact, even of soft substances, of liquids of bland nature, above or below the ordinary temperature of the atmosphere, produces great irritation of this highly impressible body, and it very readily becomes inflamed from causes which would produce no morbid effect upon other exposed tissues. When it becomes inflamed, the inflammation is not confined to the pulp, but at once, in nearly every case, extends to the alveolar processes of the affected teeth, and, as a very common occurrence, runs through all the stages of inflammation, and, modified as it is by the parts attacked, is productive of very severe suffering.

And now we find ourselves compelled to consider the subject of inflammation. This very important feature of disease forces itself upon our attention. There are few subjects in the whole range of pathology which have elicited a greater amount of careful study and investigation than that of inflammation, and necessarily so from its paramount importance. Many entire works, by some of the most distinguished and ablest writers who have ever contributed to the literature of medicine, have been devoted to this subject. The celebrated John Hunter, whose own great powers were directed earnestly to its careful study, enumerates some three hundred treatises and articles on the subject of inflammation and its consequences, and since his time they have greatly increased in number. I do not mean to intimate that it is essential to the practice of dentistry that this should be made a subject of extended special study, but I do say that the requirements of dentistry render it necessary that those who practice it should have an intelligent general acquaintance with this subject. For it must be acknowledged that inflammation, as it displays itself in the dental pulp and in the parts adjacent to the teeth, is the same in character as inflammation by which the heart or lungs or any of the vital organs are affected. Its peculiar modifications in the parts referred to can only be comprehended when studied by the light of a general knowledge of the subject itself.

But when we come to consider the influence exerted by the teeth upon the general system, a field of study of great extent and of great importance opens itself. It is a subject which still requires investigation and special attention.

Primary dentition, although, like parturition, a natural process, is, as I need not urge, attended frequently with general and fatal disorder. I cannot, of course, in the brief space of this address, attempt to go into a consideration of the elements of the disorders attributed to dentition. I can only refer to the fact that such disorders do occur, and that there are strong reasons for believing that the general disturbances attending dentition frequently depend upon the difficulty with which the forming teeth make their way through the tissue of the gum. Abundant experience has proved beyond rational question that an obstruction of this nature to the eruption of the teeth may be removed by dividing the gum when it does not normally yield to their evolution. It is an important element in the treatment of the disorders of dentition that irregularities in the development of the deciduous teeth should be well understood. There are great variations in the periods at which the deciduous teeth appear through the gum, though generally their eruption occurs in a certain uniform order. This, of course, is well known to you. And this fact has an important bearing upon the best time (a matter about which there is much diversity of opinion) when incisions of the gums should be made. Wide differences of opinion exist among physicians with regard to the amount of influence exerted by dentition in infantile diseases. By many its influence is considered very trifling, by others it is believed to be a very important element in those diseases. Although such cases will, at present, rarely come to the attention of a dentist, his acquaintance with the subject should be most thorough.

A most important phase of the effects of diseases of the teeth, extending beyond their immediate locality, is their influence upon the distributions of the fifth pair of nerves.

It is quite probable that disorders of the teeth and the parts immediately adjacent to them are more frequently the exciting causes of facial neuralgia than can be attributed to any other agencies. In depressed conditions of the system, local irritation (such as very commonly results from affections of the teeth), which in a normal state of health would be confined to the part affected, leads to very serious constitutional disturbance, and especially to neuralgia of some of the branches of the fifth nerve. These neuralgic attacks, when they depend upon the local cause referred to, are often quickly and effectually relieved by the removal of the local cause of irritation. I have met with a great number of cases of this character, and no doubt many of you have had a similar experience.

[Dr. Arthur here gave a brief account of two cases in which general treatment had been pursued for a considerable time, but without relief, because the exciting cause, entirely local, of very severe facial neuralgia, in both these cases had been overlooked. Entire relief was afforded by the requisite attention to the teeth affected. In one of these cases, the general treatment, by a prominent physician, had extended over four months.]

On the other hand, neuralgia of the trigeminus arises from causes entirely independent of the teeth, although the painful symptoms exhibit themselves in the branches terminating in the teeth. In such cases, the affection appears so decidedly to be confined to the teeth, that they have been frequently extracted, one after another, without the slightest relief. Such cases frequently come to a dentist either before or after having been under the care of a physician. It is obvious that no dentist can be qualified to practice a profession involving the necessity of discriminating in such cases unless he has had, to some considerable extent, a medical education. It cannot be overlooked that such cases may and do fall into the hands of a dentist, and it must be admitted that unless he has greater knowledge than in the estimation of the editor of the *Medical Times* is requisite for the practice of dentistry, unnecessary suffering and irreparable injury are likely to result.

If, then, this very imperfect view of the scope of dentistry is correct, who can undertake to dispute its claim to be considered a specialty of medicine? The object of dentistry is the treatment of a certain class of diseases which cannot be fully understood except by the light of general medicine, and which cannot be successfully treated except by the application of the general principles of therapeutics.

It becomes, then, a question of interest as to where the persons are to be found to meet its requirements. If the estimate of dentistry, as commonly practiced, by the writer quoted, is correct,—and that it is so to a great extent must be admitted,—then the great majority of dentists are not capable of practicing it as a medical specialty, not being instructed to the requisite extent in general medicine.

How, then, shall the community obtain the service of which, in the way of these higher requirements of dentistry, it stands in need? Shall dentists accept the position assigned them, and confine themselves exclusively to such manual operations as are required, without attempting to comprehend the nature and character of the organs of which they have undertaken the care, or of the diseases to which they are subject? Shall they leave all cases of disorder not confined to the teeth to the care of physicians? In the cases of this character just referred to, very intelligent physicians who had them in charge entirely overlooked the exciting cause of the painful affection they failed to relieve, and which would have been recognized by any dentist who had studied the general principles of disease. Physicians, as I have said, strangely neglect the consideration of the teeth, as factors of disease not confined to their immediate locality.

So far as this statement is correct, it may be partly attributed to the fact that physicians are so constantly engaged in fighting with, as they too often find, inadequate weapons, enemies sapping rapidly the very foundations of life, that they are disposed, as may be very easily understood, to overlook or under-appreciate the importance of less serious causes of disease. This is by no means to be wondered at, although greatly to be deplored; and what I have now to say is not so much in the way of complaint of the medical profession, as to establish the fact (and I consider its existence greatly to be regretted) that physicians have given so little attention to the subject of dentistry that, like the editor of the *Medical Times*, they are not sufficiently aware of its real character to consider any degree of intelligence essential to its practice. That I am not mistaken in my estimate of the acquaintance of physicians with dentistry I will now endeavor to show. Primarily, we judge of an individual's knowledge of any subject by an examination of the sources of information to which he has had access, or to which his attention has been directed. What, then, is offered to medical students in the way of instruction in regard to diseases of the teeth? No attention is given to the subject of dentistry in any medical school of which I have any knowledge. In the curriculum of one of the oldest medical schools in this country, from which one of my students was graduated, no attention whatever was given to the teeth during the two courses he attended, except a brief description of them by the Professor of Anatomy, a lecture by the Professor of Surgery on the extraction of teeth, and a passing allusion during a lecture on Neuralgia, to the effect that this affection is sometimes aggravated or caused by carious teeth. I am not aware that any more than this is done in any medical college in the country.

Harvard University, to its great credit, has lately created under its charter a "School of Dentistry," fully admitting by this action the claim of dentistry to the position for which we are contending. Its pupils receive instruction in the general branches of anatomy and surgery from the regular professors of the medical school. This is an advance, and a great advance, towards a higher standard of education in the medical specialty of dentistry. But I am not aware that the medical student, even at Harvard, receives any special instruction in dentistry, or that his attention is directed to the subject.

In addition to the lectures, didactic and clinical, delivered to medical students during the regular course of public instruction, their principal sources of information are the text-books to which they are referred. An examination of these text-books shows that they are generally silent upon the subject of diseases of the teeth; or if the subject is touched upon at all, the views presented are generally full of error.

The only medical work to which I have time to refer at any length is "Wood's Practice of Medicine." No one will attempt to question the extent of the acquirements or the ability of the distinguished author of this work.

The article in Prof. Wood's treatise on morbid conditions of the teeth is entitled "Toothache, or Odontalgia." The author states his reasons for giving the article this title to be that "toothache affords the means of connecting in one view several disorders of the teeth or their appendages, which scarcely deserve a distinct heading in a work like the present." "Caries" he defines to be "an affection of the *interior* or *bony structure* of the teeth, the enamel being without vitality, and, therefore, not subject to morbid action."

Very few persons acquainted with the nature of this affection will question the fact (and did not at the time of the publication of Prof. Wood's work) that dental caries very generally commences upon the external surface of the intact enamel, or at some defective place in it, and that the enamel is quite as subject to attacks of caries as the dentine. It is the prevailing opinion that the enamel is invariably first attacked, unless it is, as may be in some special instances, destroyed by some other agency.

He again says, "Caries sometimes begins in the *internal surface of the tooth*, exhibiting, usually, as the first evidence of its existence, a dark appearance beneath the enamel."

Now, if Prof. Wood means by the "internal surface of a tooth" the internal surface of the pulp-cavity, I need not say to you that he is entirely mistaken, and that his mistake would not have been made by any one of ordinary intelligence acquainted with the subject. Dental caries does not only not "sometimes begin in the internal surface of the tooth," but it never does. This is a theory long since exploded, long before Prof. Wood wrote his work, as he would have found if he had consulted any of the standard dental works at the time. But Prof. Wood refers to "Good's Study of Medicine" as his authority.

It must be stated that none of Prof. Wood's material is drawn from any writer upon dentistry who was considered an authority at the time of the production of his work. This theory had its origin in the observed discoloration of teeth, free from caries, subjected to some violence sufficient to deprive the pulp of vitality. The discoloration occurring in such cases does not result from caries, but from the infiltration of the tubuli of the dentine by the decomposed remains of the pulp.

Prof. Wood goes on to say, "But much more frequently it proceeds from without inward; commencing on the bone immediately beneath the enamel, and exhibiting a yellowish or brownish spot in this situation. The tissue is softened, and a small cavity formed, which after a time communicates externally by the crumbling of the unsupported enamel over it."

This is an error so palpable to any one acquainted with the subject that I need not consume any time in proving it to be so.

When we come to Prof. Wood's directions for the treatment of tooth ache, his ignorance of this subject is very striking.

Prof. Wood attributes odontalgia—

"1st. To exposure of the pulp consequent upon caries; and,

"2d. To a variety of causes independent of caries, as vicissitudes of temperature, pressure of osseous concretions in the cavity of the pulp, and from direct violence."

This statement, so far as it goes, of the causes of odontalgia is correct. The treatment advised, when it occurs as a result of any of the second set of causes, I will state in Prof. Wood's own words:

"Much may be done locally to afford relief and hasten the cure. The means are sedative, anodyne, and revulsive applications, and depletory measures, either within the mouth or externally. Among these remedies are brandy, or tincture of camphor, held in the mouth; the chewing or smoking of tobacco; various masticatories, such as ginger, calamus, pellitory, etc.; poultices to the face, either simply emollient or rendered anodyne by the admixture of laudanum; rubefacient applications, as capsicum, ginger, and mustard in the form of cataplasms, blisters to the side or back of the neck, or behind the ears; steaming the head with the vapors of hot water; scarification of the gums; and finally, leeches outside of the face or to the gums, when the inflammation is considerable, and it is deemed highly desirable to bring about resolution. In most cases the milder of the means are sufficient, as the disease is generally soon relieved by suppuration and the discharge of pus. After the abscess has formed, it should be opened if it do not speedily discharge itself; and, if it occupy the substance of the cheek, care should be taken to make an opening inwardly, lest it might break externally and leave an unsightly scar."

Now, you are all aware that when odontalgia occurs independently of exposure of the pulp from any of the causes stated by Prof. Wood, the remedy which is found effectual, and which renders entirely unnecessary all these formidable proceedings, is a very simple one, viz., puncturing the pulp-cavity.

I am tempted to refer to a case which shows that such teachings as these of Prof. Wood are not without their influence in medical practice.

I was sent for one evening, at ten o'clock, by her physician, to see a lady who had been suffering the most excruciating agony for about five days and nights. In this case, the physician was a man of unusual intelligence and ability, with whom I had some personal acquaintance, which I presume accounts partly for the fact that he called upon me to see the lady in question. The patient had been leeched and blistered and poulticed fully in accordance with Professor Wood's directions, but without relief. In addition to these remedies a large quantity of morphia had been administered, without abatement of the suffering. The pulp in this case had become affected in consequence of the close proximity of a gold filling inserted a few days previous to the attack. She was relieved at once of pain by the simple remedy I have above indicated, and to which any of you would have at once resorted in such a case.

In the paragraph following, Prof. Wood gives directions for treating odontalgia from the first cause: exposure of the pulp. His list of remedies is as lengthy as that above quoted. But he has omitted the only one which has been relied upon by the dental profession for more than forty years. This is arsenious acid. The thirtieth part of a grain of this agent applied to the exposed pulp will so far destroy its vitality in a few hours as to put an effectual stop to odontalgia resulting from an exposed pulp. This is so well known in dental practice, that if Prof. Wood had consulted Prof. Harris's work at the time he wrote his directions for the treatment of odontalgia, he could not have overlooked a remedy which has long since superseded all those he had advised to be employed.

But Prof. Wood did not, as I have before stated, refer to a single dental work regarded as authority at the time he wrote. He acknowledges that he is indebted for most of his information to M. J. E. Oudet's elaborate essay in the *Dictionnaire de Médecine Génerale.*

I have referred to the work of this very able author as an indication of the knowledge of the medical profession, at the time he wrote, of the specialty of dentistry. Later writers, Niemeyer, Flint, Reynolds, whose works have taken the places of this and other works received as authorities at the time Prof. Wood published his Practice, have generally avoided the subject of diseases of the teeth.

This subject cannot, indeed, be discussed in a treatise on general medicine without occupying space that could not be spared. The character of medical text-books has changed greatly, however, in the last twenty years, no one author usually undertaking to write upon all subjects embraced within the wide range of the treatment of disease. Special subjects are now taken up by specialists, but no work within my knowledge embraces the subject of diseases of the teeth.

It would have been well if Prof. Wood had omitted from his work the chapter on Odontalgia, as no one is justifiable in writing authoritatively, on any subject concerned with important interests, unless he is thoroughly conversant with it.

It would be well for general interests if those who control medical schools in this country could be induced to see the importance of giving some attention to this subject in their course of instruction. If such instruction were given, the graduates would certainly be better physicians, so far as they would undoubtedly be better able to recognize manifestations of disease dependent upon the teeth. It would certainly be in the power of physicians who had obtained the information which could in this manner be furnished them, to relieve suffering in many cases which necessarily fall into their hands, or at least to know when the cases should be referred to a competent dentist. It would enable them to comprehend the fact that a competent dentist, who had studied his specialty thoroughly, is something more than a mere "plugger or extractor of carious teeth."

It is a somewhat notable fact that while in this country, in which it is claimed that it has made the greatest advance, dentistry should be denied by physicians generally, with the exception of those in connection with Harvard, the position which elsewhere it is admitted it occupies, in England the Royal College of Surgeons grants a dental diploma, and so, far from regarding dentistry as a merely mechanical occupation, distinctly recognizes it as a medical specialty. Candidates for its diploma of Dental Surgery are required to furnish certificates of having been engaged during four years in the acquirement of professional knowledge. "Of having attended at a School or Schools recognized by this College not less than one of each of the following Courses of Lectures, delivered by Lecturers recognized by this College, namely: Anatomy, Physiology, Surgery, Medicine, Chemistry, and Materia Medica.

"Of having completed a course of Chemical Manipulation, under the superintendence of a Teacher or Lecturer recognized by this College.

"Of having performed dissections at a recognized school during not less than nine months.

"Of having attended, at a recognized Hospital or Hospitals in the United Kingdom, the Practice of Surgery, and Clinical Lectures on Surgery, during two winter sessions."

These requirements are additional to the study and practice of the the special details of operative dentistry.

The curriculum distinctly provides, that the subjects embraced in it are "those which are common to a general medical education, and those which pertain to Dental Surgery."

It will be seen from this statement that dentistry is regarded by those who control this distinguished college as something more than it is supposed to be by the editor of the *Philadelphia Medical Times.*

It will be observed that in attempting to maintain that dentistry is a branch of general medicine, I have confined myself to what must be considered legitimate dentistry, and I have made no reference to what is called "oral surgery." I have endeavored to show that the every-day duties of a dentist require the light of general medicine to enable him fully to comprehend them, and to render such service as suffering humanity demands at his hands.

Where is this broad knowledge of the general principles of medicine and familiarity with the general features of disease to be obtained? From medical sources. If dentistry is a specialty of medicine, it requires the study of medicine as much as ophthalmic surgery. Precisely the same necessity for it exists. "The higher education, the broader culture of the physician," is just what is needed at the present time by those who propose to engage in the practice of dentistry, to enable them to understand fully its requirements. And when this kind of culture is demanded by public opinion, a different class of men from those who now confine themselves to the manual requirements of dentistry will enter the ranks of the dental profession. Dentistry will then take the position to which its importance in relation to the public welfare entitles it. It is gratifying to observe that this view of a higher and broader professional education for those who engage in the pursuit of dentistry is gaining ground and supporters among our best men.

The subject of "Dental Education" is one of those suggested for discussion at this meeting of the association. I trust that it will receive earnest attention from you, and that you will thoroughly examine its present condition without "fear, favor, or affection."

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

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(Continued from page 5.)

In this connection, I deem it a matter of importance that I should clearly define the characteristics of the remedy of which I now propose to write. I do this from the fact that the term "creasote" is applied alike to that medicament and carbolic acid, when the latter is furnished in the form of an oily, odorous fluid, analogous to the former in appearance, and somewhat, though distantly, analogous to it in odor. From the appearance alone of these two articles, it is impossible to decide which is creasote and which carbolic acid, but an expert can usually determine with facility the genuineness of either from the marked difference in odor. I say *usually*, because the most inodorous specimens of creasote and the most odorous specimens of this form of carbolic acid do approximate quite closely in this characteristic; but even in these, the peculiar *wood-tar* component of the odor of creasote is found wanting, if delicately searched for, in smelling oily carbolic acid.

Another peculiarity which these preparations possess in common is that of being practically insoluble in water. It is in this particular that they both differ markedly from the crystallized article which is usually referred to as carbolic acid. It is also this fact which adds greatly to the necessity of explicitly establishing the medicine intended to be indicated by me when reference is made to carbolic acid.

It will readily be recognized that the characteristic of insolubility in water would much enhance the value of applications made within the mouth, and thus it is that we find most decided advantage in the employment of oily, instead of crystallized, carbolic acid.

At this point I must mention a further complication which exists in this matter, viz., that still another preparation of carbolic acid possesses physical characteristics differing from those previously mentioned, in that it is, when fluid, of the general appearance of creasote in consistency and color, and insoluble in water, and yet quite crystallizable when exposed to the action of light, or reduced to a lower degree of temperature.

In experiments with this material I have found no practical therapeutic difference between it and the constantly-fluid carbolic acid, while the odor of the two is quite the same.

I have said that it is impossible to determine with certainty the difference between samples of creasote and carbolic acid by the visual test, and that it is difficult, in some exceptional instances, to detect the difference even by the sense of smell, though this is usually quite distinctive; but we have a series of tests which, in the aggregate, are apparently quite conclusive:

1. Equal parts of creasote and glycerin shaken together make a turbid mixture which soon separates,—the creasote floating.

Equal parts of carbolic acid and glycerin make a clear solution. (Mr. Thomas Morson's test.)

2. Take half a drachm of collodion, to which add half a drachm of absolute alcohol: a clear solution results.

To this add half a drachm of creasote; a clear solution still results, varying in color according to the color of the creasote.

Again, prepare a similar solution of collodion in alcohol, and, upon the addition of half a drachm of carbolic acid, a beautiful *gelatinized* mixture is the immediate and persistent result.

3. To one drop of creasote add twenty drops of absolute alcohol. If to this are added a few drops of an alcoholic solution of the neutral syrup of the chloride of iron, a rich olive-green color is produced.

If one drop of carbolic acid is dissolved in twenty drops of alcohol, and a few drops of the chloride of iron solution are added, an orange-brown color is given. I am indebted to my friend, Prof. Henry Morton, for information regarding this test, and also for directions in preparing the solution of chloride of iron.

"The neutral ferric chloride is prepared by taking a dilute solution of that salt as it is ordinarily found, and adding ammonia as long as the precipitate formed freely dissolves on stirring; this can be carried too far.

"Evaporate the solution so obtained to a syrup; dissolve this in alcohol for the alcoholic solution."

It was in conducting a series of therapeutic experiments with what were supposed to be several samples of creasote, that my attention was called to the collodion test, in using which I was surprised to find that three of the five samples were carbolic acid.

As I have stated, I was already beginning to notice that my results were sufficiently uniform to warrant the conclusion that, for dental purposes, the various samples were of about equal value as media for relief from suffering,—of sufficiently equal power and persistence as antiseptics; of apparently equal efficacy in the admixtures with other medicaments,—as morphia, arsenic, etc.,—and that I was so frequently greeted, in answer to questions, with nothing more than strong disapprobation in regard to odor and taste, or simply absence of these, that I was compelled to adopt the conclusion that with a decision as to the one characteristic of being relatively more or less disagreeable, the experiments might end.

It being at this time that I was made aware of the fact that my more disagreeable samples were creasote and my less disagreeable samples were carbolic acid, I, of course, continued and finished the trial as creasote *vs.* oily carbolic acid,—deciding in favor of carbolic acid.

I had, some time previous to this, discarded the crystallized carbolic acid, partly on account of its frequent disagreeable odor, but mainly in consequence of the absence of reliable and permanent results from its use, which I regarded as due to its solubility in the fluids of the mouth.

In using carbolic acid as a means for obtunding sensitiveness of dentine, it, like the oil of cloves, is peculiarly applicable to such cavities, in teeth of soft structure, as contain horny dentine. Particularly, also, is this the medicament when teeth are to be gently separated, or ingrowing gum pushed out of cavities, and back from their edges, and when, from timidity or systemic conditions, exemption from suffering, and conduct of operations without the infliction of pain, is a consideration of paramount importance.

Carbolic acid is an application in which relative dryness of the cavity, and relative maintenance of the strength of the application, secure proportionately satisfactory results; therefore, while it is not at all necessary to have the cavity perfectly dry, it is better that it should be as dry as is convenient, and that the cotton (piece or pieces) upon which the medicament is introduced should be as compactly placed in position as is consistent with the comfort of the patient.

It should be remembered that carbolic acid is not only pain-obtunding and antiseptic, but is also powerfully escharotic, and for this reason the cotton which is to be introduced into the cavity should *not be completely, but only very partially*, saturated with the medicament.

By this method enough acid is taken up to thoroughly saturate the cotton when it is compressed, and, by the same means, the overflow upon the surrounding parts is most easily and most completely prevented.

Even with this precaution, it is usually found necessary to absorb some trifling surplus of carbolic acid by means of bibulous paper, and in case of close approximation of cheek, lip, or tongue, it is better to interpose a thin pellet of cotton or fold of muslin, moistened with phénol, as a preventive to unpleasant and annoying consequences.

This should be allowed to remain in position for two or three hours, if convenient, during which time the superficial portion of carbolic acid has been somewhat deprived of its potency by reason of its partial solubility.

These applications should be made daily, if possible, and it will usually be found that some daily progress in excavating can be secured. In a few visits, two, three or four, this will eventuate in the comfortable preparation of a cavity which would, in the condition of original presentation, have entailed a formidable amount of suffering.

I have given carbolic acid as the first of the remedies which may *possibly* endanger the vitality of the pulp. In this respect my experience has shown no difference to exist between creasote and carbolic acid. This occasional effect had been noticed for many years by my father, and, having been associated with him for a few years prior to his withdrawal from practice, he had mentioned to me several patients in whom he had experienced this peculiarity.

As opportunity presented, I naturally desired to test this matter, and, even with those who mentioned this idiosyncratic repugnance to creasote, obtained permission to try the application. I soon experienced a variety of untoward results, ranging from unpleasant sensations, such as faintness, nausea, headache, indisposition for exertion, etc., to positive pain, in some cases amounting to far greater suffering than is, in *bad* cases, experienced from the usual arsenical application for destroying the vitality of the pulp.

It was in these cases that I have, more recently, experimented with carbolic acid, obtaining the same results. It has been in vain that I have alternated applications without the knowledge of the patients,—the creasote or carbolic acid medications have *always* brought the same reports from idiosyncratic cases.

It is from these considerations that I have placed creasote and carbolic acid as the connecting-link between harmless and dangerous remedies for the treatment of sensitive dentine; but I wish it to be distinctly understood, that of all the *powerful* medicaments (according to the usual acceptation of the term powerful), these are the safest.

Creasote and carbolic acid rank high among the valuable dental polychrests, and for this reason should be understood and appreciated as thoroughly as possible.

The usual popular idea that they are injurious to teeth, and tend to produce decay, should be recognized as not only untrue, but just the reverse of truth; for so far from being injurious, they are absolutely beneficial, and so far from producing decay, they are among the best, if not the very best, preventives to the progress of dental caries.

It is true that the sensitiveness of dentine is obtunded by the twofold effect which these agents have, viz., that of forming insoluble phenates with the organic constituents of dentine, and thus destroying the vitality of that tissue, and, usually, at the same time having their accepted effect upon the pulp, thus, by their soothing power, rendering that organ less susceptible to irritation; but it results that, as in the devitalization of that portion of dentine which is saturated with these medicines, a *comparatively* insoluble material is produced, all disintegration of tissue must necessarily cease until the fluids of the mouth shall have so far weakened the conserving power of the creasote or carbolic acid as to permit of that decay of the devitalized structure which is due to combined heat and moisture.

It is for this reason, let me repeat, that oily carbolic acid compares favorably with creasote as an enduring application, one which can be relied upon as able to procure for us not only an immediately satisfactory result, but one which shall continue for many hours, and, in favorable cases, for many days; while the crystallized, soluble form of carbolic acid is soon dissolved in the mouth, thus permitting the recurrence of irritation with its concomitant sensitiveness of dentine.

In conclusion, I would state that various combinations with creasote and carbolic acid have been suggested as obtunders of sensitive dentine; of these we have tannic acid (tannin), chloroform, camphor, laudanum, tincture of aconite, and many others, all of which I have tried without any noticeable increase of efficacy in cases of purely sensitive dentine.

(To be continued.)

ECLECTIC DENTISTRY.

BY GEO. B. M'DONNELD, D.D.S., CONNEAUTVILLE, PA.

To know what mode, appliance, material, or medicine to use, when a case presents, to save a tooth the longest period of time possible under all the circumstances with the least possible pain and expense to our patients, is of as much importance as manipulative skill.

If I have learned any one principle more than another in twenty-one years of constant practice, it is to be more and more eclectic, and to employ each mode, material, appliance and medicine only when its use is certainly indicated. Contour fillings, adhesive gold, V-shaped separations, and soft gold are each *best* when used in their proper places, and an intelligent use of all will result in far more good than the exclusive use of either can possibly do.

By the discovery and use of new modes, appliances, and materials, the profession have been enabled to accomplish results that had heretofore been thought impossible, saving teeth that had previously fallen into the hands of tooth-extractors as only fit to be removed. But we have many failures for want of discrimination and lack of proper judgment in the application of our improvements. We have enthusiasts in our profession whose zeal has carried them to extreme practices. They have used methods and materials arbitrarily, practicing by stereotyped rules, filling teeth with anything but judgment.

For the past five years, at our dental conventions, we have listened to the panegyrics of the champions of hard, heavy, adhesive gold contour fillings, with eight-ounce mallet force, to be used under all circumstances, in all teeth, regardless of the strength of the teeth to be so filled, and of the mechanical questions involved in the gold contour restorations; denominating soft-gold fillings, with hand-pressure and self-cleansing surfaces, as "tooth-stuffing"; quoting the failures of soft-gold fillings to prove that they were right, but forgetting to mention their own failures. (Some dentists never have failures.) Opposed to these we have heard the advocates of soft gold, hand-pressure, and V-shaped separations as zealously advocating their methods in filling teeth under all circumstances, denominating contour restorations as "copper-toed" and unsightly; not forgetting to quote many failures in the practice of those opposed to them. One gentleman says he always uses the rubber dam when filling teeth; the next one says he never, or rarely, uses it, but always uses napkins when filling the most difficult cavities, without trouble from saliva. Another gentleman never uses amalgam, and ostracizes those who do as unfit to practice dentistry, and says he would extract a tooth which he could not fill with gold, One dentist always wedges teeth slowly with soft-wood wedges; the next always wedges with hard wood driven with a mallet quickly; the next never wedges at all, but separates the teeth with a file or chisel.

I might multiply such conflicting ideas, but these will suffice. Well is it for human teeth and for the future status of dentistry that there is a conservative element in the profession!

Three of the first great principles that every dentist should understand, to enable him to obtain the greatest ratio of successes in a given number of operations, are, first, compatibility of the patient with the operator; second, the laws of mechanical forces; and third, chemical action.

The importance of a perfect accord or compatibility of mind between the patient and operator is of the utmost importance to enable us to obtain the best results, and is a principle that is not half understood by the profession generally. We should never shock our patients' nerves if it is possible to avoid it by any means in our power. We must understand that their mental condition governs their nervous system to a great extent; this being a fact, the first thing to be done when patients present for an operation is to observe their condition, and if not favorable, it is useless to proceed to operate. We should never commit the too common error of demoralizing our patients by overstraining their endurance through too prolonged, painful operations at the first sitting. Especially is this precaution necessary when we are operating for children who have never had a tooth filled. It is often necessary to make several preliminary appointments with them for the purpose of cultivating their acquaintance and gaining their confidence, and when we do begin to operate on their teeth, to do it in the kindest and gentlest manner possible. Many persons, and especially children, are deterred from returning for a second operation because the operator did not understand how to educate a new dental patient.

In restoring the half of the cutting surfaces of a superior incisor with gold, it is not enough that we know how to prepare the cavity of decay of such a shape that gold can be packed firmly into it, and that we know how to make surfaces of gold to cohere together; not enough that we erect upon the one-half of a tooth an exact fac-simile of itself in solid gold; but we must also understand the amount of lateral resistance the walls of the cavity possess in which we lay our foundation of gold and upon which we erect our golden monument. First, we must know how much force to use in impacting the gold, so as not to fracture the walls of the cavity. Second, we must understand the amount of force that is to come in contact with the cutting edge of the gold, and also the angle at which this shall strike the gold. Third, we must take into consideration the chemical conditions that shall surround this beautiful handiwork. If these principles have not been recognized in the production of a filling, it will be quite likely to fail in a short time, for the reason that it had not been made in harmony with the laws of mechanical forces and chemical action. For example: *A* restores the loss of the one-half of the left superior lateral incisor with gold. After he has performed the operation to his own satisfaction, he assures his patient it will last for twenty years; and yet in three, six, or twelve months the patient returns, the restoration a failure. Why, when so much was expected and promised? I answer, Because the operation was performed without judgment, and in conflict with law. Every school-boy recognizes the law of mechanical forces when playing "titter" astride a rail placed crosswise of the fence. As long as two boys of the same weight keep an equal distance from the center of the rail, they can "titter" up and down for any length of time. But if you increase the weight at one end, or shove the rail endwise past the center, one boy is suddenly thrown up and the other down. The application of this simile in filling teeth is the following: When we make a gold contour filling in a tooth, the anchorage of the filling in the tooth-structure at its base must always possess more pounds of resistance than is to be exerted against the most exposed point of the cutting surface or projecting portion of the filling. In other words, if we insert a filling in a tooth that has only one pound resistance in its anchorage, and one and one-fourth pounds of leverage is brought to bear against its most exposed point, at a right angle with its base, by the occlusion of the antagonizing teeth or any other hard substance, the filling will as surely fail as that one and one-fourth pound is heavier than one pound.

We can put it down as a rule in contour filling that we must never build out the projecting portion of our filling beyond the point where the forces exerted against it shall be greater than the power of resistance in its anchorage. It is a fact patent to every one that where combustible material, like a dry pine board, is exposed to heat for a long time, the surface becomes charred, and it is then easily ignited by the same degrees of heat that were active in charring it. Now, if a hole should be burnt through the board, and we should patch it up with a piece of sheet-zinc, and neither remove all the charred board around the hole, nor remove the board from the exposure to the same degrees of heat, we shall get a second fire sooner than we did the first. This illustrates the conditions demanded in filling teeth ; for if in repairing a cavity of decay we leave brittle tooth-structure at any point, and especially at the cervical wall of the cavity, and then impact the hardest gold plug it is possible to make into it, restoring the contour perfectly, but making no provision for the avoidance of the action of the same chemical agents which dissolved the original tooth-structure, by leaving self-cleansing surfaces we shall most assuredly meet with failure, as the partially decomposed tooth-structure around the filling will break down and be dissolved by the action of these agents sooner than the original perfect tooth-structure was dissolved by them in the first place.

On the contrary, if, in preparing the cavity of decay, we remove every particle of decomposed tooth-structure around the entire circumference of the cavity, cutting down all feather-edges to smooth, slightly-beveled or countersunk edges,—if, making provision for the prevention of chemical action on the tooth-structure around the filling by so changing the surfaces of the teeth in contact that they shall be self-cleansing,—our fillings will last for a long time.

A little reflection on my past experience in filling teeth on the grinding and proximal surfaces convinces me that I have had a far heavier percentage of failures upon the former than upon the latter surfaces of the same teeth. This difference in results I attribute to two causes; namely, mechanical forces and chemical action. In the case of the fillings in the grinding surfaces, there was no leverage of forces that could be exerted against them; the forces coming in contact in a direct line with their axes tending to keep them in. No chemical action could take place on the surfaces of the tooth-structure around the fillings, on account of their being constantly cleansed in the act of mastication, by the movements of the tongue, and by the free circulation of fluids over their surfaces. In the cases of failure in the proximal surfaces, they were brought about by chemical action and mechanical forces combined; the mechanical forces acting against the projecting portions of the fillings, pressing them out of their anchorage, and the chemical agents acting on the tooth-structure around the fillings, getting lodgment there by reason of the contact of the teeth at those points.

As a result of my observation and experience in this direction, I came to the following conclusions: namely, that the nearer we shall expose the proximal surfaces of the teeth, after filling them, to the same action of forces and fluids which the grinding surfaces of the teeth are exposed to, the nearer we shall raise the ratio of successes in these surfaces to those of the grinding surfaces; and, although I admit that the perfect restoration of the grinding surfaces of the teeth is best for the purpose of masticating food while they last, I make the assertion that six-tenths of the grinding surfaces of the teeth are worth more to a patient for a period of twenty-five years, than ten-tenths are for only one to five years,—that time being a full average of the durability of contour operations in fragile, soft, and chalky teeth, where the fluids of the mouth are vitiated and destructive chemical agents are active. It is, in my judgment, good practice, when filling the proximal surfaces of the molars and bicuspids, to cut away one-eighth of the mesial and distal grinding surfaces with the corundum disk, leaving the separation of a very wide double V-shape, the walls being left at an angle of thirty degrees with their axis. In these cases, I believe this to be the only possible means to save such teeth.

It is of the utmost importance that we exercise judgment in deciding what should be done in each individual case, so as to give the patient the greatest amount of benefit. I think we have ten failures for want of proper judgment where we have one for want of manipulative skill. The great question, when a case presents, is what to do for that individual case, all the circumstances considered. Is it a case where soft gold, hand-pressure, and V-shaped separations are going to be the most enduring, or is hard, adhesive gold, heavy malleting, and perfect restoration of lost parts the best? or is it a case where a compromise between the two extreme practices may be best, combined in the same filling, using soft gold, hand-pressure, semi-cohesive and cohesive gold, with light mallet-force and a partial restoration of contour, combined with self-cleansing surfaces? (I think that in my own practice I have found the last-named method of the greatest value.) Or is amalgam, tin foil, Hill's stopping, or oxychloride of zinc best under the circumstances? Each of the above-named modes or materials may be best in its place, the conditions present indicating which shall be used.

I am confident that thousands of teeth are ruined annually by the indiscriminate use of heavy, hard, adhesive gold, and heavy mallet-force; where they might be saved for years with soft gold, less force used in filling, and less surface exposed to the action of mechanical leverages. As a rule, our patients whose teeth are in an unclean condition will allow them to remain so after we have operated, in spite of our advice. Recognizing this fact, we must expect a recurrence of decay in the teeth we have filled sooner than the originally perfect tooth-structure gave way, if we fill them out to perfect contour and leave the proximal surfaces in contact. But, if we leave proper self-cleansing surfaces between the teeth we fill for such patients, we do more to preserve them by our separations than we do by our filling, by changing the conditions, so that the destructive agents which wrought the ruin cannot again find a lodgment. The proof of this assertion can be observed where a tooth has been extracted and the adjoining one has a superficial carious cavity on the face which was in contact with the extracted tooth. It will often remain for years without further change. This example proves the efficacy of self-cleansing surfaces as a preventive of decay.

The dentine of the teeth will last much longer when self-cleansing surfaces are exposed to the action of mastication and the circulation of fluids over their surfaces freely, than enamel so situated that food and destructive agents are held in contact with it. The objection often made against self-cleansing surfaces is, that food often crowds down on to the point of the gum, causing the patients such annoyance that they are obliged to use the toothpick to get relief. I regard this objection as an argument in favor of separations, as the annoyance brings about just what we are so constantly telling our patients to do. Now, if this annoyance spoken of by the opponents of V-shaped separations causes our patients to use the toothpick after each meal to get relief, it answers a twofold purpose—of giving the relief sought, and clearing the surfaces of all solid and semi-solid food, that if allowed to remain in contact for a length of time would form acids, which would destroy tooth-structure around the most perfect filling, and, consequently, involve the loss of the tooth and the filling in a short time; not from a want of perfection in the filling, but from chemical action on tooth-structure around it.

On the other hand, the advocates of V-shaped separations object to the appearance of gold crowns in the front of the mouth, and would sooner destroy the pulp of a tooth and pivot it than have such an unsightly thing. Now, I hold the dentist guilty of pulp-murder who wantonly sacrifices a pulp on the shrine of false pride with an ordinary pivot-tooth; the beauty is only skin-deep; the reality is a miserable sham, usually emitting an odor from the point of contact of the natural stump and the artificial crown which is not pleasant. A gold crown, when properly mounted, is the same all the way through,—sweet, solid, and good as gold, and durable besides, standing guard over the life and vitality of a pulp for a longer term of years by far than any other agent could possibly do.

Gold continues to be the material *par excellence* for filling teeth where the tooth-structure is of sufficient strength for the gold to be impacted into the cavity without fracturing its walls. There are certain exceptional cases, in the posterior teeth, where a good amalgam plug will serve a better purpose and save the teeth longer.

There are a number of different kinds of soft and cohesive gold manufactured at the present time, each claiming to be the best; in my own practice I use thin, soft, and semi-cohesive gold in anchoring and filling up the bulk of the cavities, finishing up the exposed portion with hard, heavy cohesive gold. The softer gold can be used in filling up the interior of a cavity, and coheres the better.

In the preparation of gold foil for filling teeth, we cannot be too careful not to handle it; for, however clean we may wash our hands, there are more or less of the excretions of the system oozing from the pores of the skin. This fact can be easily demonstrated by rolling or folding one strip of gold thus, and another on a clean napkin or piece of spunk with a nickel-plated spatula, and then passing each piece through the flame of an alcohol lamp. From the former there may be seen steam and smoke arising, while in the latter we cannot discern either.

Tin, amalgam, Hill's stopping, and oxychloride of zinc are all good materials for filling teeth where they are properly used. I think it is not improbable that at no distant day a plastic material will be discovered for filling teeth that shall possess all the good qualities of gold with none of its objectionable ones. The man who shall make this much-needed improvement will most certainly be a benefactor of his race.

The value of rubber dam as an auxiliary in filling and restoring teeth, especially where they are decayed under the margin of the gum, cannot be overrated. Of course it is not necessary always to use it, especially when filling small cavities in the grinding surfaces of the teeth in favorable mouths, with slight flow of saliva; but in all extensive and difficult operations I deem its use absolutely essential to enable us to get the best results, besides which, it is a great convenience and comfort to both patient and operator. Objections are made to its use, by gentlemen of high standing in the profession, on account of the pain inflicted when using and applying it. The objection, I think, is not well taken, as rubber dam in most cases saves far more pain than it inflicts. As an obtunder of sensitive dentine I have never found its equal. I often have cases where it is impossible for the patient to bear the pain inflicted in excavating the dentine prior to the application of the rubber dam, that within thirty minutes after its application are enabled to endure the excavation with ease. As a result of the exclusion of moisture and evaporation from the dentine, the dentinal fibrillæ to a certain extent lose their power to convey sensation. The rubber-dam clamp is an excellent assistant to the ligature to keep the rubber in position around the necks of the teeth, especially in the posterior part of the mouth.

The matrix to be used for restoring the distal walls of the molars and bicuspids is indispensable to enable us to make the most perfect operations on those surfaces, especially when the cavity of decay extends down to the cervical walls or under the gum.

A burring engine has become an actual necessity in every well-regulated dental office, facilitating our operations at least fifty per cent. None but those who have used them can fully appreciate their value for preparing cavities, drilling out fissures, cutting down and polishing fillings, cleansing teeth, etc.

The corundum disk is an excellent substitute for the file for separating the teeth, performing the operation very much faster than the file, leaving the surfaces very much smoother, besides being much more agreeable to the patient.

A saliva-pump should be used in cases where there is an excessive flow of saliva, as it will save the patient's clothes, and the operator the annoyance of having his patient swallowing continually.

Mack's and Osmond's gold screws are often indispensable to success in building.

As a rule, anchoring-pits should not be made at the cervical walls of cavities or the necks of the teeth, as the pulp is often exposed thereby. A slight groove, made with a narrow-pointed excavator, is much safer, and, as a rule, anchors the filling firmer than the pits, with little danger of exposing the pulp.

At no distant day we will have a motive-power in dental offices for running our burring and drilling engines. The point to be gained in its use will be, that we will be enabled to stand on both feet instead of one while operating, which is an absolute necessity to enable one to produce the best results with the least fatigue.

Perfectly sound teeth, as a rule, should never be separated with a file, and the dentist who does so is censurable. To separate teeth in anticipation of decay is as censurable as would be the extraction of every other tooth in the head in anticipation of and to prevent approximate decay in the remaining teeth. There are cases where this practice would save teeth, but, as a rule, it would be the worst possible practice, for the following reasons: there are persons who have entire sets of teeth which do not decay from youth to old age, and others, part of whose teeth decay at an early period of life, while a part of them remain sound to old age. Any interference with teeth, when in a perfect condition, with the file or disk, on the presumption that they will decay at some future time, is, therefore, to be deprecated. There is no doubt that in cases where superficial caries has already begun, Arthur's treatment is right, and the best thing that can be done to such teeth is to separate them at once with the corundum-disk, leaving double V-shaped separations. So far he is right, but the separating of sound teeth in anticipation of caries cannot be good practice. I made V-shaped separations between the teeth twenty years ago, to get room to fill them, and did fill them with soft gold. Some of those fillings are in a state of good preservation at this time, and I am fully satisfied that a self-cleansing surface is the cause of their extraordinary durability.

WHAT MAY PATIENTS REASONABLY EXPECT SHALL BE ACCOMPLISHED BY OPERATIONS ON THE TEETH?

BY GEO. H. CUSHING, D.D.S., CHICAGO.

(Read before the New York Odontological Society at the Special Meeting, December 14th, 15th, 16th, 1874.)

The question which it is the purpose of this paper briefly to consider, is one which very largely affects the interests of the dental profession. If the true solution of it could be clearly arrived at and accepted by the profession, their interests could not fail to be very favorably affected thereby; while so long as it remains an unsettled question, or is but imperfectly understood, or carelessly defined, it must prove more or less detrimental to professional interests, and, it may also be added, to the interests of humanity, for the two are identical.

It is quite certain that this subject has not engaged the serious thought of the profession to the extent that its importance demands; and the endeavor will be made in this paper to so answer the inquiry in a general way, as to arouse attention to its importance, with the hope that through your discussions and the influence of your society it may be brought more generally before the mind of the profession at large, with such an impress of the best thought upon it from your members as will secure its proper consideration, and lead to its speedy and correct interpretation.

The true professional mind could hardly rest satisfied without being able to give an unequivocal reply to this query, and yet it is more than probable that the diversity of answers would be almost as great as the number of individuals replying.

The general public, who are especially interested in the truthful reply to this question, can have no proper appreciation of the value of our services until this question can be answered truthfully and with a common understanding by the profession at large; and they have a right to demand that it shall be so answered.

It will not be undertaken here to discuss the question as to what the public may have a right to expect from the assumed or from the apparent attitude of the profession toward them.

Whatever that attitude is,—whether true or false,—we shall not here attempt to say. If it be false, it must, as speedily as possible, be corrected; if true, it will need no reference except such as will naturally come from a consideration of the answer to the question under discussion.

It is not at all the purpose of this paper to attempt an exhaustive essay. It will only be attempted to place the subject before you in such a manner as to elicit a full discussion of all points incident and essential to a full understanding of the question. It is essential to anything like a fair consideration of this question, that dental practitioners should be properly classified. Of course this can only be done in a general sense, as it might be said that there are as many classes as individuals.

For the purposes of this paper, it will be proper to class them under two heads, viz.: one class embracing all those who are endeavoring constantly, honestly, and conscientiously to do the very best that can be done, and who avail themselves of the various means to that end which are within their reach, *i.e.*, association, free interchange of views and experiences, and the literature of the profession, both standard and periodical. The other class, of course, embraces all those who do not avail themselves of these means, and who, either from prejudice, ignorance, or dishonesty, choose to remain in the disreputable rear-guard of a truly noble profession. The importance of this distinction needs not to be argued, and in treating the subject of this paper, the first mentioned class of practitioners will be understood as the profession—the authors of the operations under consideration.

In attempting to answer the query started by this paper, very many points require consideration. A direct answer, and perhaps one which would be given by the greater number of respondents, would be that patients might reasonably expect that their teeth would be preserved to extreme age, or until lost from other causes than caries. This might, in a certain sense, be affirmed with entire truth, and yet such results are generally so contingent upon conditions beyond the control of the dentist, that it would not be right to say that such expectation would be reasonable without stating the conditions on which alone it is possible, in many cases, for this statement to be true.

The conditions of course are, that patients shall obey implicitly the necessary instructions of their professional advisers.

Now, just here it is proper to call your attention to a very grave error which patients are apt to cherish, and one which, unfortunately, too many of the profession are inclined to foster, and that is, the supposition that teeth once well filled will last forever. You are all doubtless aware to what extent this false idea prevails, and you know as well how in part it has come to prevail,—because some practitioners not only have allowed their patients to take this for granted, but have many times assured them that operations would last indefinitely—never requiring renewal. Not only do a large number of persons hold this view regarding operations performed, but very many of them seem to think that, having had the teeth once put in good condition, they will never require any thing more to be done, either to those already operated upon or to any others,—as though there was some conservative property residing in the gold which is placed in certain teeth that would surround with its saving influence all the teeth in the head.

Until the public mind is disabused of this idea, and the profession generally make it a rule to instruct their patients that these operations are, in the very nature of things, liable to be but temporary in their character, we can have no basis upon which patients can found any reasonable expectations. Again, there are some individuals who have no faith at all in the operation of filling teeth, because they have found in their own experience, or in that of their friends, that certain teeth that had once been filled were, in a few years afterwards, hopelessly decayed.

This conviction is arrived at on their part in most cases because of the above-named false promise that teeth once filled require no further thought, and consequently they have neglected the essential after-treatment and professional supervision necessary to insure the best results.

These points are emphasized here because they enter so largely into the question which it is sought to solve, and because it is certain that the false position which the profession to-day occupies before the public (to whatever extent it is false) is due mainly to a lack of a proper appreciation of its duties in this regard.

Probably no one would deny that, if children were placed under the dentist's hands at the proper age, and he was allowed to have entire control of them, so far as their teeth were concerned, until maturity, their teeth could all be preserved up to that time; and yet how many parents are there who think that their children *are* thus placed in the dentist's hands, and that they are really complying with all his reasonable demands, who yet find that results of operations are continually disappointing them, and who are not made to realize that they have criminally neglected the instructions of the dentist. How many are there who have been instructed by their dentist to bring their children to him every three months, who bring them only every one, two, or three years. And again, how many have been instructed in the importance of the thorough cleansing of the teeth, especially after eating, who think their children do all that is necessary by brushing their teeth upon rising and retiring, neglecting entirely the only periods when brushing can be said to be of any great value? Thus, while children may be nominally entirely in the hands of the dentist, yet they are in fact not at all so in the proper sense, and a failure to arrive at the best results is the consequence; a failure which is oftentimes unjustly charged to the dentist. This laxity on the part of patients and parents is partly the fault of the profession, in that they do not sufficiently impress upon them the importance of observing their instructions; but it is not altogether so, for there are many who will not follow such instructions, however carefully given.

It cannot be too forcibly urged that the profession could do very much more towards insuring compliance with their instructions than they are doing, if they were themselves thoroughly impressed with the importance of the subject.

As in the cases supposed above, the circumstances attending them would be essential elements in making a prognosis regarding them, so, in general (with every case having some individual peculiarity probably), must be considered the different circumstances under which operations are made; the various characteristics of the individual mouths which are treated; the greater liability to decay in the teeth of some individuals, and the less liability in those of others; all these considerations must have weight in determining the solution of this question.

The fact cannot be ignored, that the mere operation of filling teeth does not alter their character as organs liable to disease,—the same after the operation as before,—that the operation does not remove the causes of decay, which may still continue active, or become so at some future time, and which will again prove destructive of other parts of the teeth under conditions favorable to such destruction. Were it otherwise, a very positive affirmation could be made of the benefits which might be expected from these operations.

In view of the premises thus set forth, what then may be offered as a proper answer to the question sought to be solved? This, viz., patients may reasonably expect from operations on the teeth just what an honorable, conscientious practitioner promises them they may expect under the conditions he (the dentist) may impose; that the benefit derived from operations will be in the precise ratio to the obedience to such instructions, and that patients, doing their duty as faithfully as the dentist does his, may hope to retain their teeth as useful organs to an indefinite period. These things may reasonably be expected; but there are some things patients may not reasonably expect.

They may not expect that so long as they are mortal will they be entirely exempt from danger of caries, nor need they think that mere manipulative skill, no matter of how high an order, bestowed in making the most faultless operations, will justify them in continuous disobedience of the laws of health, or the disregard of those measures of prevention which experience has demonstrated to be essential for the preservation of the teeth, without being called upon to pay the penalty.

Keeping in view these considerations, it will be the fault of patients themselves if results *seem* to bring discredit upon the profession.

The duty of the profession in this regard is very clear,—that they see to it that they do not promise more than they can perform, and that they do not allow their patients to comfort themselves with hopes not founded in reason.

AN IMPROVED (?) METHOD OF TAKING PLASTER IMPRESSIONS.

BY JAMES SMITH TURNER, M.R.C.S., LONDON, ENGLAND.

(Read before the New York Odontological Society, at the Special Meeting, December 14th, 15th, 16th, 1874.)

The question of plaster impressions has little novelty to recommend it. Like many other questions in our profession, it comes to the front, or falls to the rear, according to the difficulties which beset the more active-minded among the rising and the more recently-established members of the profession. The senior members, who have overcome, or think they have overcome, all the difficulties attending any process, are generally contented to let matters rest. They can accomplish all they desire by a system which has become familiar to them by practice, and to the deficiencies of which (this I say with all respect) they have learned to shut their eyes; or if they see them, it is in a light flattering to their own proficiency, which enables them to give a pharisaical hug to their superiority. The young members, on the other hand, who are ever looking out for a royal road to excellence, make a rush at the last new thing, perhaps to discard it with equal readiness. Plaster impression-taking has gone through those phases, and is likely, in common with other questions, to go through the same again.

There are those who use one material, and those who use another; and there is a large number of men who, while believing in the superior excellence of plaster moulds for almost every case, confess to a want of manipulative skill, or to a want of power over their patients which deprives them, in many instances, of the use of this excellent material. There are also those whose timidity deters them from ever commencing its use, while many have yet to learn how to use the more simple materials. It is to the timid and unskillful, with whom I have that fellow-feeling which "makes us wondrous kind," that I would now address myself. If proficients in the art see anything worthy of notice in my plan, I shall be all the better pleased. I am not going to argue the question, nor enumerate the difficulties connected with the subject. Suffice it to say, that objections are raised to plaster moulds for partial cases, owing to the difficulty of obtaining a correct model all round on which teeth can be mounted as well as a plate fitted. To get a good mould involves more endurance than many patients can give, and a great amount of work from the operator, both in breaking up the mould and in piecing it together again.

I propose, by making certain alterations in the tray, and by applying the plaster in a different manner than hitherto, to obviate some of these disadvantages. I convert the handle of the impression-tray into a funnel, which opens by an oval aperture on the base-plate or palate of the tray, immediately under its external aspect, the lower border of which forms the upper boundary of the opening. The outer end of the handle forms the mouth of the funnel, and this has a rim about the twelfth of an inch wide round the outer side of its free border.

I take an impression in the ordinary way, with wax, but, giving no heed to the palate, direct my attention to the outer circumference of the mouth, or, in fact, to every part on which I do not wish the plate to fit.

When I withdraw this preliminary mould, I cut away the wax from wherever I wish my plate to rest, as these are the parts of which I wish a plaster impression. I have then left a wax mould of the front of the remaining teeth and gums, and also of a part of the palate behind that on which I wish the posterior part of the projected plate to rest. My next step is to make air-vents round the margin of the wax. I then oil the funnel, and fix to its mouth, by an elastic band or a piece of string, a small pouch composed of sausage-skin, or some such cheap, yielding, waterproof material; then mixing my plaster in the usual way, I pour it into the pouch through the palatine opening of the funnel. The tray is then replaced in the mouth, and held in position by the left hand, and with the right the plaster is pressed out of the pouch, and when it passes through the air-passages with a bubbling sound, you may reckon enough has been squeezed in, and that the impression is taken. The plaster soon becomes hard enough to admit of the withdrawal of the hand which holds the pouch. An impression thus taken is easily withdrawn from the mouth, owing to the yielding nature of the wax, while all essentials are preserved by the plaster. If a fracture occurs, the plaster is so thick that it is easily pieced. By this process there is no chance of any but the smallest gushing of plaster which may pass through the air-vents getting where it is not wanted. The vents should be made free and wide where they open between the margin of the wax and the cheek or lip, but those in the bar of wax which stretches across the posterior part of the palate should be narrow and V-shaped, the apices resting on the tray. Of these last vents, two are sufficient.

I send a model taken in this way, and a tray prepared for taking the same, and if my paper does not prove practical, I hope it may prove suggestive. I may add, that the plaster is best mixed with tepid water as a hardening medium. If a saline be used, it makes the plaster unpleasantly cold.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST JUDICIAL DISTRICT DENTAL SOCIETY.

REPORTED BY F. M. ODELL, D.D.S.

This society met December 1st, 1874.

W. G. A. Bonwill, speaking of his diamond reamer, said he thought one would last for three years; had already used one for about a year. Recommends it for the permanent separation of the incisors. The shape is pyramidal. It makes about five thousand revolutions per minute, and in consequence of its extreme rapidity causes not the least pain, even when cutting upon the most delicate enamel. I use it for anticipating decay, and for removing incipient decay, preserving the beauty of the tooth, etc. Working so rapidly and perfectly, it will cut through or over the surface of the poorest fillings, without disturbing them in the least.

I commenced the use of hard rubber and corundum twelve years ago, making files of it.

For disks steel was first used; but steel disks do not stand at all; they soon fly to pieces. After that Dr. Arthur brought out his shellac disks; but these do not stand very long. The rubber disks are worth a hundred of the shellac disks; they can be shaped any way you choose with the diamond without injury to the latter.

The soft-rubber disks are made of ordinary packing-rubber, without any corundum in them, merely using polishing-powder with them. Can with perfect safety do by this means in fifteen minutes what would require ninety minutes by hand. Another use of the corundum disk is for sharpening burs. The expense of a diamond is about ten dollars. It is the usual carbon diamond.

Drs. White, Jarvis, and Stockton addressed the meeting on topics of interest.

Dr. Burk reported a celluloid case of three years' service still working satisfactorily, although presenting a somewhat flaky appearance.

The subject of discussion for the evening, "Development and Treatment of Alveolar Abscess," being then called up, a paper in that connection was read by Dr. R. M. Reynolds.

Dr. Latimer puts his tooth (afflicted with alveolar abscess) on probation for a week (after thoroughly cleansing, filling the canals with pure carbolic acid, and the crown with plaster of Paris); afterwards, if all goes smoothly, filling crown with Hill's stopping for a month before filling permanently.

Dr. Clowes cleanses, washes with pure warm water, forcing the water through the fistula, then immediately fills permanently with ox. chlor. zinc.

Dr. Southworth thinks we use too much medicine in the treatment of abscess. Thinks it should be left more to nature to effect the cure, simply assisting her a little, as in the case of boils or felons. Recommends the use of minute doses, say one-fifth of a grain of mercurius vivus of the third decimal preparation, in say one and a half and two hour intervals, until relieved. Has known the second dose to effect a perfect cure.

In reply to a question, Dr. Atkinson expressed his firm conviction that, under certain conditions, even the two-hundredth trituration would be sufficient to have a direct action upon the system. Thinks it does not matter what the canals of a tooth are filled with so long as you fill them perfectly.

Dr. Fitch cited a case where, failing to pump creasote through a root-canal of a lower molar, so as to see any appearance of it through the fistula, he had succeeded in forcing it through the fistula up into the canal.

At the clinic this P.M. a hundred people were in attendance.

CONNECTICUT VALLEY DENTAL ASSOCIATION.

THE twelfth annual meeting of this society was held at Heyn's Hotel, Springfield, Mass., October 13th and 14th, 1874; forty-eight members present. The following officers were elected:

President.—Dr. J. J. Anderson.

First Vice-President.—Dr. H. F. Bishop.

Second Vice-President.—Dr. H. W. Clapp.

Secretary.—Dr. L. C. Taylor.

Treasurer.—Dr. E. M. Goodrich.

Executive Committee.—Drs. W. H. Jones, A. W. Howland, E. A. Stebbins.

Adjourned to meet in Northampton, June, 1875.

L. C. TAYLOR, *Secretary*,
Holyoke, Mass.

CARD TO THE PROFESSION IN PENNSYLVANIA.

THE undersigned committee were appointed by the "Pennsylvania State Dental Society," at the meeting held in July last, to prepare a bill to regulate the practice of dentistry, and to protect the people against empiricism in relation thereto, in the State of Pennsylvania.

The committee have so far completed their work as to have perfected a bill and placed it in the hands of a competent member of the House of Representatives, and now they ask that members of the profession throughout the State should use such influence with their Senators and Representatives for its passage as they may be able to exert.

Any one desiring a copy of the bill can procure it by addressing a line to the chairman.

C. N. PEIRCE, 1617 Green St., Phila.
LOUIS JACK, 1533 Locust St., Phila.
J. H. MCQUILLEN, 2100 Arch St., Phila.
R. H. MOFFITT, Harrisburg.
JOHN MURRAY, Rochester, Pa.

EDITORIAL.

DENTAL EDUCATION.

WE devote a large portion of space in this issue to the discussion by Dr. Arthur of the subject of dental education. As will be seen by reference to our Periscope in the January number of the DENTAL COSMOS, and in other dental and medical journals, both of this country and of Europe, there is a wide-spread interest in the subject of professional education, and particularly in the direction of specialism. As on all such questions, there are differences of opinion as to methods, but there is remarkable unanimity in the recognition of the need of more thorough preparation.

The agitation of the question brings under consideration a variety of topics: the legitimate sphere of dentistry; its relation to medical practice; the relative advantages of private and collegiate instruction; the class of institutions best calculated to secure the end sought; the length of time necessary to be passed in pupilage; the character of the examinations, special degrees, etc. These all challenge and should receive the thoughtful attention which their importance demands. The result sought for is the desire of all honest hearts; the conflicting opinions are only as to methods. There is, therefore, necessity for a dispassionate, unselfish discussion of the whole matter. No one should enter the field of controversy until he can say in sincerity, "In what I have to offer, institutions and men are nothing; the true and permanent elevation of my profession is my highest ambition." Let us have, gentlemen, one and all, no personalities, no asperities, no needless public washing of dirty linen, but a full, free, frank, earnest endeavor to place the dentistry of the future on a basis which will reflect honor not only on those who are hereafter to practice it, but on us who are so largely responsible for that future.

When those who have better claims than the writer to be heard shall have placed themselves on record, we shall probably have more to say upon this topic.

OBITUARY.

DR. F. R. THOMAS.

Died, at Philadelphia, January 11th, 1875, F. R. Thomas, D.D.S., in the thirty-second year of his age.

His death resulted from injuries received on the preceding Saturday. He was returning after dark from a drive, when his horse became entangled in a mule-team attached to a freight train. He was thrown from his carriage, and so badly injured that amputation of the left arm was necessitated. He did not rally after the operation.

Dr. Thomas was born in Pottsville, Pennsylvania, October 14th, 1843. Studied dentistry, and graduated at the Pennsylvania College of Dental Surgery in 1869.

After his graduation he devoted himself entirely to the extraction of teeth during anæsthesia.

He did a large and constantly-increasing business in this specialty, and was widely and favorably known for his expertness as an operator.

He was a genial, kind-hearted gentleman, and had hosts of friends, who sincerely mourn his untimely death.

PERISCOPE.

Something New, or believed to be so, in Dental Surgery.—Besides many other advantages enjoyed by the Fellows of this Society, too obvious as well as too numerous to recount, it is, I cannot help thinking, especially in their favor that the rules by which their proceedings are controlled are sufficiently broad and elastic to admit of the consideration of any one of the almost countless branches of the subject to which it owes its name. But for this latitude, on which I have especial reason to congratulate myself this evening, I should have hesitated to tender for your consideration, at any rate without a prefatory apology, a paper connected with the practice of dental surgery.

The rapid advance in the practice of medicine and surgery that has been steadily and unceasingly exhibited even within the short period of our personal recollection is doubtless in some measure due to its subdivision into the component parts that are now made severally the subjects of individual study and special application, and it is a considerable encouragement to those whose immediate sphere of action is comparatively limited to one branch of the wide-spreading system that their successes are recognized and esteemed, not as isolated instances of disconnected interest, but as tending to augment the aggregate importance of medical science.

The particular case of which my paper treats I believe to be rare, but not sufficiently so to justify my bringing it under your notice on the ground of singularity. I would rather beg your patient attention to a brief narrative of the means adopted for its treatment, which I have reason to think are devised and practiced for the first time; and I shall be especially gratified if it proves to be of sufficient interest to provoke the discussion that is invaluable in the elicitation of relative truth and the elucidation of the subject on which it is brought to bear in the spirit that animates the Fellows of this Society.

In May, 1873, I was consulted by an Indian officer in the prime of life, and in the enjoyment of good general health, impaired only by a condition of teeth that gave rise to a great amount of painful nervous irritation, interfered with his power of distinct articulation, and, in addition, considerably marred his personal appearance. Extremes of heat and cold, and the contact of sweets and acids, served to increase his discomfort, and to interfere in more than a slight degree with his enjoyment of life.

The casts which I have on the table will aid me in explaining the appearance of the mouth as it was when first presented to me, and will also be of assistance in illustrating the means I adopted for the relief of the patient; but before submitting them to your inspection, I should like to describe as accurately as I am able, in a few words, the impression produced on my mind by the abnormal condition of both the upper and lower jaw that I was called on to treat.

The teeth in both, and more markedly the six front ones, bore striking indications of deterioration by attrition, but as they failed to attain contact when the jaws were pressed together, it was plain that the loss of substance could not be attributed to their mutual action on each other. Now, although one of my objects in publishing this case is to elicit the opinions of others as to the primary cause of the condition alluded to, I may mention in passing that I am myself inclined to trace its existence to the effects of salivation by mercury, which this gentleman remembered having been subjected to, although so long ago that my inquiries did not at first recall the circumstance to his mind. Previous experience had led me to be especially careful to regard the antecedents of the malady, for I am of opinion that there are other phases of the subsequent action of mercury than those that it ordinarily presents and that are generally recognized.

John Hunter, in his work entitled "The Natural History of the Human Teeth," published in 1788, bears testimony to the existence of the disease, which he defines as "the decay of the teeth by denudation," but he at the same time distinctly states it to be his opinion that it is (I am quoting his own words) "an original disease in the teeth themselves, and not dependent upon accident, way of life, constitution, or any particular management." Joseph Fox, likewise, makes mention of it, and is disposed to think that it may be induced by some solvent quality in the saliva; whilst Thomas Bell, at the same time that he confesses his own inability to assign the effect to its true cause, condemns Fox's theory as "wholly at variance with the fact that certain teeth are more liable to it than others, as well as with the situation of its commencement, and the regularity of the direction in which its ravages are carried on." In later works upon the treatment of the teeth, such as Mr. Tomes's, I have failed to discover any mention of this particular form of disease.

But to return to the narrative, from the direct course of which I have a little digressed, and with the purpose I have named.

In addition to the suffering consequent upon the morbid sensitiveness of the teeth, or rather what remained of them, to which I have already made allusion, an incalculable amount of chronic discomfort was inflicted by the peculiar form which they had assumed, causing them to resemble nothing to which I can compare them but a row of upright spikes so sharp and jagged that it was useless to try even to hope that the mouth could ever accommodate itself to them as occupants; whilst, at the same time, the express stipulation made by their owner in the very first stage of my acquaintance with him—that he should under no circumstances be subjected either to the most trifling measure of pain, or to the influence of any anæsthetic whatever—rendered his chance of obtaining relief extremely hazardous.

He, indeed, went so far as candidly to assure me that he would prefer to endure his present distress rather than submit to any treatment that I could not first assure him would be absolutely painless; whilst, as I have already said, his prejudice against nitrous oxide gas and chloroform was far too vivid for me to attempt to overcome it by argument.

Under ordinary conditions the case presented no remarkable complications, and the course of procedure would be simple enough. The teeth would be filed down level with the gum, and each nerve withdrawn singly, either during a state of unconsciousness artificially induced, or, if the patient's courage and endurance were equal to the demand upon it, without deprivation of the sense of touch, preparatory to their being replaced by artificial substitutes. But, fettered as I was by the compact between us that I should desist from manipulation directly my patient was conscious of a sensation of pain, I must allow that I did not anticipate the first operation with the confidence that is so valuable an auxiliary in the attainment of success, being well aware that the withdrawal of the nerve of a tooth is capable of causing—and, indeed, so long as there is vitality, never fails to cause—the most exquisite pain to the subject.

In this instance I indulged a hope that the employment of the ether-spray might render me valuable assistance, and the result did not fall short of my anticipations; but I did not resort to it until I had, on the first occasion of operating, filed the tooth that I selected for experimental treatment as deeply as I was able to do in the ordinary manner, ceasing only when my patient betrayed a sense of discomfort. The application of the spray, judiciously handled by my friend Dr. R. Lee, of whose proffered assistance I had gladly availed myself, and on subsequent occasions, when I was unable to secure his services, the employment of a piece of cotton-wool dipped in ether, and laid first on the tooth and then on the instrument, enabled me to continue the process until the nerve of the tooth, with artery, vein, etc., was exposed.

And it was at this moment that I put to the test of practice the theory that had suggested itself to my mind, as not only a possible solution of the difficulties by which I was somewhat hardly pressed, but as an enduring means of escape from the performance of an operation that has always appeared to me to be at variance with the first principles of surgical art. I mean the demolition of the nerve, which is, as you are doubtless aware, a practice of every-day occurrence, not always, I take it, justified by the circumstances of the case. Here I had cogent reasons for refraining from the attempt, but it was no new thing for me to seek for a method of evading what I believed to be false in principle and defective in use.

If a nerve with the vessels that accompany it is qualified by its nature and position to convey vitality and afford nourishment to so dense a structure as the tooth, I hold it to be a fatal mistake to remove it so long as it is performing functions that you are entirely incapable of causing to be fulfilled without its assistance. And the result never fails to make silent protest against the unmerited treatment; for the tooth, deprived of so important an adjunct as its internal supply of nutriment, eventually perishes,—affording another proof, if an additional one were required, of the fact that nothing has been created in vain.

My object was to attain a safe and efficient method of preservation in lieu of the destructive system which I so cordially deprecate, and it is for the success accomplished in this particular alone that I lay claim to the title of originality.

The process I pursued was as follows: With a delicately cut pencil of hard hickory-wood dipped in nitric acid, I very gently and very deliberately cauterized the exposed portion of the nerve in each tooth successively, which, rendering the surface insensate, enabled me to perfect my task of reducing the teeth to the level of the gums with a file, without inflicting on the patient any of the pain he so much dreaded.

It then remained only to replace the ejected members with artificial substitutes, in the use of which he enjoys a complete immunity from the various inconveniences that he had suffered from when in the state I first described to you, and of which the models afford ocular evidence. I think, therefore, that I may fairly assert that in the treatment of the foregoing case, which I have described to you as accurately as I am able, I may count on having at least perfected the subjugation of two formidable obstacles that lay between me and what alone I should care to call complete success. In the first instance I overcame the difficulty—no mean one, as it appeared to me at first sight—of painless manipulation; and in the second, I was able to do what was even more gratifying to myself: to prove the possibility of evading a practice which, though universally recognized as legitimate, I have long held to be in direct opposition to the spirit of the laws that guides us, and by so doing to bring myself a step nearer to the attainment of what we all strive for in doctrine as in practice,—the art to retain what is sound and to reject only what is unprofitable.

Before concluding my paper, I should like to advert for a brief moment to the topic with which I opened it,—one which has been with me the subject of grave and earnest consideration. I mean the recognition of the various sections into which the great system of medicine is rightly enough divided as "parts of a whole,"—branches owing their vitality to the main stem, from which they derive nutrition and support.

I have been perhaps insensibly led to the study of the subject by my experience of the impediments that are occasioned in the paths of both by the line of demarkation that is supposed, and in many cases permitted, to exist between those practicing the specialty in which I am myself engaged and those who follow simple medicine or simple surgery. I do not allude to any want of harmony between the men, but to what I am not, I hope, overbold in defining as a want of mutual professional appreciation sanctioned by the system. I myself estimate daily at greater value every minute atom of the general knowledge that furthers my utility in my special vocation, and in like degree I am tempted at times to regret the deficiency of men infinitely my superiors in mental capacity and attainments in that which would, I know, be of inestimable value to themselves.

Specialism must exist. It has been a spontaneous and, I believe, a healthy growth, consequent upon the expansion of science, the increase of population, the advancement of civilization. All that I would argue is, not that the specialist should cease to be a specialist, but that his preliminary knowledge should be as diffuse as though a clear and distinct perception might at any moment be demanded of him of other subjects than that which he may make his prevailing study. And, as it is necessarily in his education and training that the balance must be adjusted, I hold it to be extremely advantageous that they should be conducted on as comprehensive a system as possible. I have for this reason—whether rightly or wrongly, certainly conscientiously—discountenanced what are termed "special hospitals," and I hope and believe that the day is not far distant when one roof will shelter all the various schools in which it is advisable that a young man should gain the knowledge that is to be the secret of his strength in days to come.

If each of our metropolitan hospitals were provided with a dental department, duly and fitly organized, and not, as at present, devoted principally to the study and practice of extraction only, the benefit would be incalculable, not only to the rising body of medical practitioners, but to the public. Caries of the teeth is of all diseases the most common to humanity, and all who practice the healing art should surely be capable of its treatment by remedial measures rather than by what ought to be the last resort, extraction. Among the crowd of students who throng the general hospital there are few who know with any approach to certainty where their lot in life will be cast, and it is for them to acquire, as far as possible, the instruction that will render them independent of the facilities that are afforded to the occupants of cities only.

To those gentlemen who may be summoned to practice their calling in remote counties a more thorough acquaintance with this subject would, I believe, be of greater importance than they are aware of; whilst to the many who are placed in charge of the men of the army and navy on foreign service it would be a means of increasing their income to no despicable extent, for to them alone have the civil population in many instances the opportunity of applying for assistance.

In my earnest desire to plead the cause of a science that has hardly, I think, received its due meed of attention, I have, I fear, sir, trespassed full long on your time, but as my motives have not been wholly interested, I hope that I may be forgiven; and I would only remind those who may be induced to devote more of their time and thoughts to it, that they need hardly account that to be a wholly inglorious field for labor in which they may avow themselves to be fellow-workers with John Hunter.—*William Donald Napier, M.R.C.S.E., before Medical Society of London. Med. Times & Gazette.*

The Preparation of Dental Specimens for the Microscope.—You all know the structure of a tooth too well to require me to mention it here; so without any further preface, I think I may as well at once put you on the right road for studying the minuter structures for yourselves. The implements I use for cutting sections are those which may be found in any ordinary dentist's work-room. Of course there are many ways of setting about the work, and I have heard of a very good section of a tooth being ground down on the hearth-stone, but this I am afraid must have been a very tedious operation. Another plan is to saw a slice out of the center of a tooth and finish the section off on a wet hone, certainly an economical proceeding, because two or three sections may be cut from one tooth; but I think the best way is to grind a tooth, if a longitudinal section is required, on a moderately coarse corundum wheel, until the center of the tooth, or any other part that may be wished for, is reached, after which the freshly ground surface should be polished by being rubbed on a fine hone with plenty of pumice powder and water, and finally finished off with a buff and putty powder. Care should be taken that all scratches be effaced; this can be readily ascertained by examining the surface with a small magnifying-glass: such as used by watch-makers answers the purpose very well. When the one side is finished, the tooth should be cemented to a small square of glass; this enables you to hold the tooth more firmly while grinding down the other side, and is done by warming a little old and hard Canada balsam on the square of glass and pressing the finished side of the tooth down into it, taking care that the tooth is pressed well down upon the glass, so that the thickness of the cement will give you some guide as to the thickness of the section; leave the tooth thus prepared for a few hours, so as to allow the balsam to get perfectly hard, and then proceed to grind away the other side, until the section is very little thicker than a piece of note-paper, then use the hone to grind it as thin as you wish, using, as before, plenty of water and pumice powder; and now care is required, for it is quite possible that a desire to obtain an extra thin section is rewarded by the partial, or perhaps total disappearance of the section. I have seen it done myself, and it made such an impression upon me that I cannot refrain from cautioning you not to be too energetic. When the section is thin enough the exposed side should be as carefully finished off with the buff as the other was; for you must remember that the slightest scratch on a microscopical specimen is magnified into a serious blemish when viewed even with a medium power. Of course a transverse section may be made in the same way, but in this case it is better to use a saw to cut out the part required, and grinding it down to the required thickness, always finishing with the hone and buff. This plan may be slightly altered, by simply cutting down the tooth as thin as possible, and polishing the two sides of the section at the same time by rubbing it between two plates of ground glass with a small quantity of pumice powder and water, taking care to finish the section by rubbing finally between older and consequently more worn-out ground glass. When cleaned from all adherent particles of débris the section may be dried, and at once mounted in balsam; this plan has one great advantage, as thinner sections may be cut this way than in any other.

However, returning to the first method described, the next operation to be performed is to remove the section from the glass; heat in this case must *not* be used, as it causes the section to curl up, making it perfectly useless, and I think that I may as well caution you here never to apply heat where any section is concerned, for it will invariably spoil the specimen; the best method of removing the section from the glass is to place the glass with the section downwards in a small saucer containing spirits of turpentine or benzole, which in a short time will so soften the balsam as to allow the section being slid off the glass. I say "slid," because that is the best method of removing the section, for if an attempt be made to raise it, and the balsam be at all stiffer in one place than another, the chances are that the section will be broken and consequently spoilt. When it is freed from the glass, and as much adherent balsam as possible has been cleared away with your finger, in the palm of your hand moistened with chloroform, it should then be transferred to a watch-glass containing spirits of wine, in which it should be soaked, and all foreign matters brushed away with a small camel's hair brush; it is then ready for mounting. If time or other circumstances will not permit of its being mounted at once, it should be left in the watch-glass or in a bottle containing spirits of wine.

I think it would be as well before I leave the subject of section-cutting to give you a brief description of the method of preparing a section of a tooth *in situ.* For this purpose the lower jaw of any small animal should be taken and soaked in absolute alcohol for the purpose of drawing all the water from the tissues; the alcohol should then be evaporated, and then the jaw should be placed in a solution of hard balsam and benzole, and left in soak for two or three days; it is then taken out and the benzole is allowed to evaporate, leaving the balsam in the sockets of the teeth; this should be allowed to get quite hard. I should recommend it being left for quite a fortnight, and then the section may be cut in the ordinary manner, finishing between the plates of ground glass, the balsam preventing the teeth from falling from their places.

Next we come to the means of mounting specimens, and here again great care must be taken, for neatness is very essential where the operation of preparing microscopic objects is concerned. Never hurry your work; it is better to leave your section for days than to have to scramble through the work and to find afterwards that all your labor has been lost; every care must be taken that all the materials used for mounting are perfectly clean, and this maxim is the real secret of good preparations. Cleanliness must be the first object to aim at; all the rest follows. As you have more practice, so you get more expert in preparing specimens. For mounting sections of teeth the best medium is Canada balsam; this requires a little practice before it can be used with certain success. A small quantity should be placed by means of a glass rod upon the slide and gently warmed; care must be taken not to allow it to get too warm or it will curl the section. As it gets warm, small bubbles of air will collect upon its surface, which should be removed by means of a needle. The section should then be taken from the spirits of wine, quickly dried between blotting-paper, and transferred to the slide; then press it evenly and gently down into the balsam, and place the covering glass upon it. This should also be pressed close to the section, and the slide should then be set aside to dry; when the balsam has got tolerably hard, the slide should be finished off, by scraping away the superfluous balsam, which may be done with an ordinary penknife, and if wished a further finish may be given by painting round the edge of the glass cover with Brunswick black; and last, although not least in importance, I would recommend you to label the slide, not only putting the simple name of the object, but also any peculiar feature it may exhibit; by so doing, much time and trouble may be saved, for you will then be able to pick out at a glance any particular object you may wish for.

Having now traced the course of a section from the tooth to the cabinet, I think a few remarks upon the preparation of the pulp would not be misplaced.

The best tooth from which to take the pulp is a temporary canine; for some reason or other the pulps of the central and lateral incisors always appear gelatinous; directly the tooth is extracted it should be placed in a bottle containing a mixture of glycerin and water, about half-and-half, until you are ready to make use of it; to get out the pulp a line should be cut with a fine saw or file round the tooth longitudinally, and then with a pair of cutting-nippers the tooth can easily be broken in two. The pulp should then be carefully lifted away from the tooth by means of a pair of fine dissecting forceps, taking the apex of the pulp in the forceps; the extracted pulp should then be put in a coloring solution and left to soak for a short time. The best solution for this purpose is the carmine preparation recommended by Dr. Beale. Twenty-four hours' soaking in this is sufficient to stain the pulp throughout, when it may be removed from the staining fluid and well washed in distilled water, and transferred to Price's glycerin, the denser the glycerin the better. A small piece of the ordinary glass slide may now be used as a compressorium and a gentle pressure put upon it, the pressure increased a little every day; by this means the pulp will be gradually flattened out, and the distribution of the nerves well shown. When sufficiently thin the pulp may be permanently mounted in glycerin jelly and the cover cemented round with gold size.

A section of a tooth may be cut with the pulp *in situ*, by putting the tooth immediately it is extracted into a staining fluid, and leaving it in soak for some length of time; by this means the staining fluid is gradually imbibed through the small opening in the apex of the fang. After the tooth has been left to the action of the staining fluid for a sufficient time, it must be decalcified; this can be done by placing it in a solution of ten drops of muriatic acid to one ounce of water; it must be left in this for about six weeks, after which the tooth can be cut with a razor.

Sections of soft tissues, either longitudinal or transverse, are always interesting objects for examination, especially those cut transversely, but require, however, a great deal of patience and perseverance before it is possible to succeed; but we must not be discouraged by any seeming difficulty, and if our attempts fail at first they will in the end be rewarded. In the case of a tooth pulp, the method seems simple enough in description, and is this:—having stained the pulp as I have before described, it is laid on a glass slab, and the sections are cut in either direction with a Valentin's knife moistened with glycerin.

It may not be amiss here just to give you a short description of the method of cutting sections of larger specimens. The tissue should be first hardened in spirit, and here I may say that it is always advisable to leave the specimen in the spirit for nearly a fortnight; the next thing to be done is to give some support to the tissue while the sections are being cut; this is to be done by imbedding it in stearine, or a composition of half paraffine and half white wax, which should be melted, and poured into a light metal tube, or into a cone of paper, taking care that the diameter of the tube is about half again as great as that of the subject to be cut; the imbedded mixture should be allowed to cool sufficiently to support the specimen when it is placed in it, and this should be held steadily until it is tolerably firm, when it should be set aside to get perfectly hard; it is just as well to keep the part containing the subject moistened with spirits of wine. To cut the section, however, a small instrument is required (such as I have here, and which was devised by my father); it is merely two tubes running one within the other, known as "triplet tubing," having at the top a glass-covered stage, which serves as a guide for the cutting instrument; at the lower end a cap is fitted for carrying a screw, by which the thickness of the section is regulated. (With this instrument sections about one two-hundred-and-twentieth of an inch in the thickness can be cut.) The knife used for cutting should be moistened with spirits of wine, and the cut should be made steadily for the whole length of the blade; a sawing motion should be carefully avoided; the sections as they are cut should be dropped into a saucer containing alcohol and covered up until they are required for mounting, which should be done with glycerin jelly and gold size.

The carmine solution, which I mentioned as the best for staining pulps, is readily made, and I think it is always best to make injections and staining fluids, whenever it is possible, for you are more certain of their purity. Put into a test-tube ten grains of carmine in small fragments, with half a drachm of strong liquor ammoniæ; by shaking this and with the aid of a spirit-lamp the carmine is soon dissolved; the solution is then to be boiled for a few seconds and then allowed to cool; after the lapse of a few hours, much of the excess of the ammonia will have escaped; then add two ounces of Price's glycerin and two ounces of distilled water, and mix thoroughly; next add half an ounce of alcohol, and then filter, or allow the solution to stand for some time, and then pour off the clear fluid, which is to be kept for use. This solution will keep for months, but sometimes a small quantity of ammonia will escape, and carmine deposited; this, of course, can easily be remedied by the addition of a few drops of liquor ammoniæ. Care must be taken not to have the solution too alkaline, or coloring will be too dense, while, on the other hand, if the reaction of the solution be neutral, it will stain all parts alike, and the appearances from which we learn so much are not produced.

And now I want to call your attention to the value of polarized light in examining sections of teeth. Each separate part of the structure of a tooth gives a different tint, and in examining the cementum or of exostosis of it, it will prove most instructive, as every exacerbation of the inflammatory attack which produced it is marked by a different tint, and made more evident by a line of deeper color dividing it from the preceding layer.

Among other things worthy of your attention are the various aspects the tooth presents under different conditions. If we examine a section of a tooth attacked by caries, we find the dentine blackened and the tubuli almost obliterated; the best teeth to obtain these specimens from are those in which caries is only just making its appearance; for if it is allowed to continue its powers of destruction, the dentine becomes too black to allow of examination likely to bring out the various features of decay. In making these preparations, care must be taken not to disturb the decayed portion of the dentine.

Globular dentine is found nearly always in honey-combed teeth, and presents somewhat the appearance of imperfectly fused globules, and is rather transparent when compared with the normal dentine. Secondary dentine, viewed with transmitted light, has very little difference in appearance to the primary, excepting that the tubuli are more decidedly curved, although following the direction of the primary. When the polariscope is used, however, the newer dentine gives a decidedly different tint, marking the different density of the matrix.—*Mr. Charles E. White, before Dental Students' Society. British Journal of Dental Science.*

Diseases of the Enamel.—Notwithstanding the compact structure of this substance, it is in early life subject to inflammations and malnutrition; and at a later period, though not manifesting the same signs of inflammation that are exhibited in soft tissues, yet it undoubtedly goes through some of the movements which result in inflammation and death of the tissue.

During the development of the permanent teeth and before eruption, or even after eruption, all those portions of the dental crowns which are still covered by the gum, or within their respective sockets, are peculiarly liable to be injuriously affected by eruptive disease, accompanied by much fever. Scarlet fever, measles, and smallpox leave their impress upon the enamel with great certainty. The enamel organ participates in the dermoid inflammation, and the enamel prisms cannot by any possibility escape. The delicate sheath which envelops every prism, being of the same histological structure as the enamel membrane itself, is easily affected, and every prism may undergo inflammation. These delicate sheaths constitute the *basal* structure of the enamel. It is into these cells the fluid phosphate of lime is invited and becomes crystallized. Upon the severity and extent of the inflammatory process depend the appearance and physical condition of the enamel after the tooth is erupted.

Let us keep in mind that at this period cell life is in its greater activity; everything is in motion; work is going on incessantly in every organ, and every tissue. *Building* is in progress; but if the workmen are sick, the process is arrested. When there is general disease the appetite fails; digestion suffers; food is not made into pabulum, protoplasm is deficient, and there are no *materials* for building, even if the builders were able to work. So *here* if nutrition is arrested, then absorption will predominate, and a line of depression show around the tooth after its eruption. This will depend on the length of time during which the development of the organ was arrested, and whether wholly or partially so. Wool of sheep, hair, and nails show the marks of defective or arrested nutrition, caused either by sickness or want of food.

I have to-day, July 15th, the depression or groove running across each thumb nail caused by a fortnight's sickness in March. The depressions or shallow grooves so often observed running across the incisor and other teeth, are the result of arrested development. The white, soft, chalk-like spots on the enamel are caused by inflammation of the enamel cells, or sheaths of enamel columns, while yet the phosphate of lime was uncrystallized. Stasis resulted, and the lime salts in that chalky enamel to-day are not crystallized; consequently there is no firmness or density to the tissue.

That enamel which appears seedy, or granular and still hard, was produced by inflammation and shrivelling of the enamel membrane, after the enamel cells had crystallized their contents.

In healthy and naturally developed enamel there is a circulation of the plasma of the blood through every enamel cell membrane; not by vessels, of course, but through osmotic action, such as takes place in every part of the body, at a greater or less distance from arterial vessels. To deny this is absurd.

In every portion of the body there is a territory outside of any nutritient canals, which is constantly importing and exporting products. The activity of these motions depends much on the age of the individual, for it is well known that, as age increases, nearer and nearer a static condition is reached, which at last may become perfect in some of the hard tissues, and especially in the enamel.

It is important to keep this in mind when we are making observations upon the teeth after eruption.

Every experienced observer knows that all of the hard tissues of the teeth are in a state of mobility before the fifteenth year, and *I* shall say, for a long time afterwards. The enamel has not upon its exterior that vitreous appearance that it has later in life. This may be owing to the more perfect crystallizations of the lime salts at a later period. As we extend our investigations deeper into the enamel substance towards the dentine, we find less and less compactness, for that portion lying next to the dentine hardens later than the exterior portion. The exterior is always in advance of the interior; the same remarks will apply to the dentine, but in the latter nutritive changes take place to a greater extent, and more rapidly than in the enamel, just as might be expected, for it is a softer tissue. A large number of observers have demonstrated that absorption often takes place in the dentine, and a much smaller number have demonstrated that it does, in rarer cases, in the enamel itself. We have seen that inflammation of the enamel membrane before eruption causes necrosis of that tissue, and now we wish to see how that pathological result may be observed to take place in the already erupted tooth. Let me tell you what I have hundreds of times seen, and then we will try to arrive at a theory which will explain the phenomena. I am looking into a fifteen-year old mouth, and I see the anterior surface of a right under first molar. It is smooth and vitreous in appearance, and has no abrasion or crack on its surface, but there is a whitish spot about the center of its surface. It is "off color." It has lost its polish; it cuts like rock salt; as I penetrate farther it cuts easier, until I arrive at the dentine, which is as hard as we find it at eight years after eruption.

I see the same tooth in the mouth of a person aged twenty. The spot is *brown* instead of white; it has a vitreous surface, smooth and without signs of disintegration. It cuts hard at the surface, but immediately the thickness of tissue paper is cut through, the enamel is found friable, chalky to the feeling, and when the dentine is reached the latter is found more or less *softer than natural*, apparently decalcified, and a circumscribed cavity is formed, bounded by harder tissue.

I see the same tooth and surface in the mouth of a person aged twenty-five. The spot is black; vitreous surface; no disintegration. The blackness penetrates the enamel, shading off into dark-brown until it reaches the dentine, where it still shades off into lighter brown, until the natural color of healthy dentine is reached. This black spot, vitreous in hardness and polish, cuts at first like very thin feldspar, but grows less dense, not seeming porous, as I go in; then becoming granular, and when the dentine is reached it cuts something like hard wood across the ends of its fiber, shading off into normally hard adult dentine. The previous condition of this tooth was that of pressure, caused by one now extracted. I have observed so many cases of this kind that I can attribute the pathology to nothing but necrosis of the enamel, caused by pressure, followed by stasis of circulation in enamel cells; a similar condition being caused by inflammation extending to dentine tubes, and decalcification of dentine previous to necrosis of the latter substance.

Spontaneous abrasion, or denudation, can only be fully explained by a *theory* which covers the ground which I have gone over, namely, that vital action plays an important part in all pathological conditions of the dentine and enamel.—*Henry S. Chase, M.D., in Missouri Dental Journal.*

Does the Use of Flour promote Decay of Teeth?—There is no doubt that the decay of teeth prevails to an alarming extent, and it is very humiliating to our modern civilization to have it characterized so generally by the occurrence of diseased teeth. The etiology of this disease is a great, broad, and deep subject. No doubt many elements combine together to cause it; and the person who should positively announce a single agent would be dismissed as unworthy of attention. Still, it is a matter worth discussing, and deserving the attention of the ablest minds. To ignore is not to arrest; hence we offer a few suggestions for consideration.

"The *Chemical News* ascribes potato rot to a deficiency of lime and magnesia in the soil. Different observers state the percentage of magnesia in the ash of sound tubers at from five to ten per cent.; in the diseased tubers an analysis shows only 3.94 per cent. Analysis of sound tubers shows over five per cent. of lime, but in the ash of diseased tubers only 1.77 per cent. was found. A similar observation was made some years ago by Professor Thorpe, with regard to diseased and healthy orange-trees; in the former there was a deficiency of lime and magnesia."

According to these authorities, a deficiency of mineral salts in the vegetations named is supposed to be a sufficient cause for decay. Now, it is an interesting question whether there is any article of food employed by mankind which is deficient in mineral matter. If so, then it should be made known to every family in the land.

Perhaps there is no article of food more generally consumed than flour,—*i.e.* wheat flour. In the forms of bread, cakes, and pastry of all kinds, it enters into every house, and is universally used and regarded as the "staff of life."

Does flour possess a requisite amount of mineral matter?

To answer this question, Mr. Sharples, the well-known chemist, analyzed for me the "Peerless Flour." He found 0.55 per cent. of mineral ash, a little over half of one per cent. He stated also that the proportion of ash in the whole grain varied from 1.65 to 2.50 per cent. So that the diminution of mineral food varies from two-thirds to four-fifths. In other words, *by the use of flour, mankind loses from two-thirds to four-fifths of the elements that go to make up teeth and bony structures.* This statement deserves to be written in letters of gold over the door of every bakery and kitchen in the land.

Flour has been used for generations, and if we can rely upon Mr. Sharples's statement, mankind has all this while been deprived of the greater moiety of the mineral food that the Almighty intended it should have the benefit of. Is it not natural to expect that the bony structures should suffer from this great withdrawal? For it is a *great* withdrawal. Suppose that a water-supply pipe should be cut off two-thirds to four-fifths, would not the supply be greatly diminished? Cut off the same quantity of time from the hours of daylight; would not our darkness be great? Take away two-thirds to four-fifths of our muscular food; would not a strong man become very weak? Cut off air to the same extent; would we not lose our breath? And why should the bony tissues not suffer in like manner when their food is withdrawn? I think they do. Perhaps a little evidence in the contrary direction may throw light upon this.

A dentist, whose name is well known, said that he filled some fourteen cavities in the teeth of his first-born child by the time he was four years of age. He put his family upon the use of the whole grains, and the next child had no retarded dentition, and not a decayed tooth up to the same age!

The same gentleman says that the teeth which decay are not compacted or knit together with the firmness of healthy teeth. There seems to be an arrest of perfect development. Though what can be more natural than to expect imperfect development and decay, when from two-thirds to four-fifths of the proper bone food is habitually withdrawn from an article of diet which is more largely used than any other?

How common it is to see infants not cutting any teeth at all, until they are twice as old as they ought to be! The good effect of the whole-grain diet is shown in Dr. Harriman's second child, above alluded to. To be sure it is only *one* case, and must not be made too much of.

Now, what is to be done about it? Certainly one man's dicta amounts to but very little alone. What we need is evidence from others. Suppose that every medical association of Massachusetts take up this matter, have analyses of flour made, try feeding mothers and children upon the whole grains of wheat-meal, oat-meal, corn-meal, beans, etc., and suppose they all come to the same conclusion as the writer has done. Suppose they officially announce the result. Would it be long before the general public would heed the truth, and thousands of persons would rejoice in the possession of that priceless treasure, a set of perfect teeth?

NOTE.—Through the kindness of Mr. E. H. Davis, Superintendent of Public Schools in Woburn, Mass., the writer has been furnished with the following *astounding* statistics, embracing returns from several of the largest primary schools of Woburn, a fair representation of the prevalence of diseased teeth among children:

	No. Scholars.	With Sound Teeth.	Decayed.
Lawrence Primary	113	13	100
Plympton St. Primary	94	27	67
Highland St. Primary	71	25	46

—*Ephraim Cutter, M.D., in Boston Journal of Chemistry.*

HINTS UPON THE USE OF ANÆSTHETICS.— . . . This experience suggested to me the necessity of a larger evaporating surface, and, as a result, the following apparatus.

It consists of a wire frame-work, sufficiently large to cover the lower part of the face. The wires are parallel, and about an eighth of an inch apart. Between the wires, from side to side, a strip of bandage two and one-half inches wide is passed. By reference to the figure (Fig. 1), the manner in which this is accomplished will be readily understood. Upon the right, a part of the wire frame-work is purposely left exposed to show the manner of its construction. The instrument is only about four inches long and three inches at its greatest width, and yet it consumes nearly three yards of bandage when passed between all the wires. By further reference to the figure, it will be seen that each section of the bandage is separate from the adjoining one, thus permitting the air to pass freely to both sides of it. When ready for use, the sides are covered, but the top is left open for the free entrance of air and for convenience in supplying the ether. I usually supply the ether from a graduated bottle furnished with a dropper-cork (Fig. 2), as by such a convenience I can add the ether as gradually or as rapidly as the case may demand.

FIG. 1.

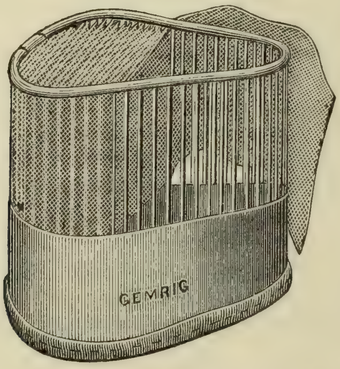
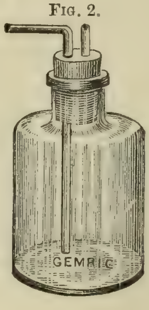


FIG. 2.



My mode of using it as follows. Placing it over the face, I sprinkle on *a few drops* of ether,— I mean literally but a few drops. In a few seconds I add a few more drops; and usually in from half a minute to a minute I find that I can drop it more constantly. As soon as I notice *the deep inspirations* I pour on a small stream, watching carefully lest I irritate the larynx, and as soon as I find the patient tolerant of its vapor I add it in larger quantities, and as rapidly as can be evaporated, and am usually gratified by seeing my patient pass *quietly* under its influence in from three to ten minutes.

Now, it may be asked, what advantages does this possess over the towel and sponge? First, let me speak of the disadvantages of the towel and sponge. The towel is usually fashioned into a cone, and placed in a similar cone of paper. The object of the paper cone is to prevent the evaporation of the ether, *so that the patient will get it all.* Now, it is quite certain that the patient does get all the ether, and that by means of the paper cone very little can escape. But it will be noticed that there is left but a very small evaporating surface, for the *inner surface* of the towel mainly yields the ether; and it is still further true that the more rapidly the ether is poured on—*i.e. the more fluid ether there is in the meshes of the towel—the less rapidly is the vapor of ether evolved.* The reason of this is obvious upon a moment's reflection. The moment the ether is poured on liberally, the towel becomes wet with it; its various folds, lying in close contact with one another, are filled with fluid ether, and it may not inaptly be regarded as a solid mass of ether, whose evaporation is only possible from the inner surface of the towel. This is a matter of easy demonstration. Take, for instance, two towels; fold one into a cone, and, investing it with a paper one, pour on an ounce of ether. Take another towel, and, suspending it so that its entire surface is exposed to the air, pour on a like quantity. The latter will be dry, and there will not be a trace of ether left in a minute's time; while the former will be damp and cold, and yield a strong odor of ether for at least five minutes.

With the sponge it is even worse. The sponge usually recommended is the finest that can be found. The pores, so to speak, are very small, and when two or three ounces of ether are thrown upon it it becomes a mass of liquid ether, with an exceedingly small evaporating surface, and hence wholly unfit for the rapid disengaging of the vapor of ether.

I return now to what I think I may in all fairness claim for the apparatus.

1. It possesses *a large evaporating surface.* You will remember that it consists of a bandage three inches wide and one hundred inches long, so arranged that in its entire length no fold touches its fellow, and with a free access of air to all parts of it. As compared with this, the evaporating surface of the towel or sponge is very small.

2. With a large evaporating surface there must be rapid evaporation of the ether, and consequently rapid anæsthesia. I have placed patients under its influence in three minutes, seldom requiring ten minutes.

3. With rapidity of evaporation may be associated *economy* of ether. I usually require less than *two ounces* in adults, and rarely three ounces.

4. There is no exclusion of the air, and no unpleasant laryngeal irritation. I have rarely had a patient cough or spit during the administration, and it is extremely rare for patients to remark upon its unpleasant odor or object in the least to inhaling it.

In this respect it presents a marked contrast to the mode commonly adopted. It is usually considered important to exclude the air, and to give the patient "nothing but ether" to breathe. The result is that the patient resists as for life, and is only overcome by superior numbers.

Lastly, the inhaler need not be removod from the face ; and, the supply of ether being constant and fresh, the patient passes under its influence quietly,—often without a struggle. Even after I have effected complete anæsthesia I continue adding it in small quantities,—a few drops at a time,—watching the degree of effect, which is usually indicated by the character of the respirations. A little experience will enable one to maintain throughout an entire operation a uniform degree of anæsthesia,—a condition very gratifying to the surgeon.—*Oscar H. Allis, M.D., in the Philadelphia Medical Times.*

Poisoning by Odontocroll.—*To the Editor of the Philadelphia Medical Times:* Dear Sir,—Allow me to offer to your notice a case of peculiar interest in my practice. My only apology for so doing is to inquire if there are parallel cases on record, and if so, the principal points of their treatment. It is interesting to the profession, for the reason that the compound afterwards mentioned is in use among our dental brethren, and any practitioner may be called suddenly to a similar case, and be at a loss how to act, as I was.

I was hastily summoned, on Monday evening, the 19th ult., to administer electricity to a man, supposed by the messenger to be dying, who had been carried to a physician's house. The patient, Mr. W., is a chemist, and, during the practice of his profession, has discovered a combination of hydro-carbons which had been found by himself and a dentist of eminence to be a very successful remedy for odontalgia. The compound, called "odontocroll," or "carvocroll," is a heavy, oily liquid, of smoky odor and taste, and has been introduced in the dental market as a local anæsthetic for toothache. Mr. W., the dentist, and a friend met in the chemist's laboratory, in this city, and further tested the drug by placing a few drops upon smoking-tobacco and inhaling the vapor. Mr. W. placed ten drops in his pipe, and, having smoked in the usual manner for a few minutes, poured ten more drops in it. After puffing a few times, he suddenly dropped, insensible, upon the floor, but in a few seconds revived entirely, and insisted upon resuming his smoke. To this his friends objected, and, during the discussion following the refusal, he again became insensible. They then removed him about two blocks, to Dr. D.'s office, and on the way thither he fell to the sidewalk, "collapsed," two or three times. This happened at nine P.M. I reached him at ten, and while I was listening to his story he fell upon the floor again, unconscious. This had happened several times since he had reached the office. Upon examining him during his fall, I found the countenance somewhat dusky, the pulse normal in force and frequency, all the voluntary muscles relaxed except the abdominal, and the pupils responding quickly to light. I endeavored to arouse the breathing, which was completely suspended, by placing one pole of the battery over the right phrenic nerve, and the other over the stomach, using the current from one cell, interrupted and secondary. This I repeated during two successive attacks; but the electricity did not seem to quicken the return to consciousness or respiration. The only appreciable effect was to make him complain of great weakness as soon as he could speak, and, fearing the too prolonged influence of the battery, I suspended its use. The suggestion was made that another physician should be summoned, and an old experienced practitioner was called in at eleven. He advised the administration of brandy, of which about half an ounce was given. The attacks gradually became less frequent, and, after some time, gave premonitions of their approach by grimaces and bodily contortions, which were invariably followed by the insensibility. At half-past twelve we called to our aid two policemen, and removed him to his home, about three blocks distant. He struggled hard all the way, evidently from the effect of the brandy, but as soon as he was placed in bed became quiet, and had no more attacks during the night. In the morning he reported himself as feeling as well as usual, though somewhat weak and sore from his falls and struggles on the way home.

The unconscious state lasted usually from twenty to thirty seconds, came on suddenly, and passed off as quickly as it came on. During this time respiration was entirely suspended, and all sensibility lost. The conjunctiva and dorsum of the tongue were repeatedly touched without producing any reflex muscular action, and his appearance was that of a person in a state of complete anæsthesia. While conscious, he acted as usual in perfect health, nor was he himself aware, by any premonitions, of an impending seizure. Nothing was given him but some aromatic spirits of ammonia and the brandy mentioned.—*P., in Philadelphia Medical Times.*

THE PRESSURE OF THE SALIVA IN THE GLANDULA SUBMAXILLARIS.—The pressure of the salivary secretion in the duct of the submaxillary gland has long been known to be remarkably high. Hering has investigated the reason of this (*Wien Sitz.*, 1872, iii. 2), and finds it is due to the circumstance that this gland secretes a colloidal substance having a remarkably high endosmotic equivalent. This colloid substance is probably mucin. The only difficulty is to explain the rapid formation of this under nervous influence; but the difficulty is only apparent, since a very delicate membrane alone intervenes between the mucin contained in the cells and the interior of the tubuli of the gland.—*The Lancet.*

ODONTOLOGICAL SOCIETY OF NEW YORK.—This body, comprising the representative men of the dental specialty of New York City, has just concluded a meeting of three days' duration, during which were presented and discussed a series of elaborate essays such as would be a credit to any professional body that might assemble in the country. At this meeting were collected as guests of the Society quite a number of the prominent teachers connected with the different dental colleges, together with gentlemen from different sections of the United States, most distinguished in the various departments of the specialty.

The subject of professional education and practice, which was discussed with unusual warmth, exhibited markedly the inclination entertained for a wider sphere of work, and portrayed plainly enough that the conversion of the dentist into the oral surgeon is only a question of time.

The ranks of the common mother-profession would receive a valuable addition in such gentlemen as compose the New York Odontological Society, and we most cordially unite with a speaker from your own city in trusting that the day is not distant when all shall be children of one alma mater, working in harmony and with a mutual interest for the common good of suffering humanity.—*M.D., in Phila. Medical Times.*

HINTS AND QUERIES.

What is the treatment for decay on the grinding surfaces of all the molar teeth for a child two years old,—the cavities being about the size of a small pin's head?—Junior.

Will some one please inform me how to remove the black deposit found between the teeth after repairing?—T.

Reply to S., who asks, what to do with Rubber Dam after using it.—Wash it in clean water; then, with a cement made of rubber dissolved in benzine, cover the holes with a piece of the dam; let it dry, and use again, punching new holes above or below the patch.—C. S. D.

Reply to X., who wishes to know what is the best article to remove wax from the fingers.

Tell him sal soda will do it at once.—T. J. B.

Retarded Dentition.—Thinking this case of late dentition interesting, I report it.

A Mr. B., at the age of twenty-one, having never erupted any teeth, called upon a dentist to have a set made. Upon examination his gums were found much swollen, and he was advised to wait awhile to see the termination. And lo and behold! he erupted a full set. He was quite ill during his teething period.

He is a man of stout frame, and enjoys good health. I understood that it is characteristic in his father's family for the children to erupt teeth at an advanced age.—Benjamin H. Catching, D.D.S., *Hazlehurst*, *Miss.*

A Suggestion.—A convenient arrangement for making any desired size of hole in rubber dam is to have a pin set at an angle of forty-five degrees to the surface, at some convenient place on the instrument-case. The pin should be of round steel, with the end round and smooth, and projecting about three inches from the surface of the table, on which the left hand may rest while stretching the rubber over the pin. The thumb of the left hand will greatly aid in guiding the blade of the pocket-knife or other instrument used. Stretch the rubber firmly over the pin. Place the thumb-nail of the left hand against the pin at the required distance from the end, varying according to the diameter of the hole required. Pass the knife-blade along the thumb-nail, cutting through the rubber, and you have a perfectly round hole.—J. W. Keyes, D.M.D.

Securing Frail Walls.—Decay frequently progresses from both proximal surfaces of molars and bicuspids, until the outer and inner walls are entirely detached and have no support except their frail attachments at the necks of the teeth. I bind them together by passing a rivet through both walls, with the head on the inside. As the best mode of doing this may not come to every dentist without considerable thought and labor, I will give my mode, which is very easy:

Take a half-inch section of a common pin of large size, and you have what the rivet ought to be, except that it should be of gold. I use wire nearly as thick as Osmond's small screws, and make the heads as nearly like a pin-head as may be.

Before drilling for my rivet, I fill the tooth with oxychloride of zinc, and when it has become hard enough cut away sufficient of the anterior portion to enable me to see the progress of the drill.

Selecting the firmest places in the walls, about one-eighth of an inch from the points of the cusps, I first drill through the outer wall and then continue on through the inner wall. I countersink with a bur-drill the palatal surface, so that the head of the rivet will pass beyond the surface. Instead of countersinking the outside in the same way, I cut a groove with a wheel-shaped bur. Then cut off the rivet so that the end passes beyond the outer surface but half a line, file the end perpendicularly, and with a very fine file split it one-sixteenth of an inch. Place the split end in the broach-holder, and take a narrow fold of gold, made of No. 4 or 5 foil, four thicknesses, and wrap the head with it, turning the strip frequently, so that it will not wrinkle or run off. The inside of the head must be wrapped very nicely and kept quite smooth, by turning between the thumb and finger of the left hand. This is all very easily done and takes but little time. Now place the rivet, and see that the split end protrudes through the outer wall a very little. The head of the rivet can be pressed home by using the ordinary bayonet-shaped alveola forceps. Next turn down the split ends; one toward the neck of the tooth and one toward the point of the cusp. To accomplish this, I place first a half-curve excavator between the points, and, placing the point of one beak of the forceps on the head of the rivet, press carefully with the other upon the excavator. This will separate them a little. I then take a half-curve plugger and proceed in the same way, and, if necessary, use one still larger.

In this way the riveting is very easily done. A very little drilling between the points of the rivet, on each side of the groove, will suffice to hold cohesive gold for finishing the surface perfectly. The palatal surface will need but little work to make a perfect finish.

And now the two walls are bound firmly together, without the least danger of springing apart while condensing a gold filling, and the tooth can be made strong enough to do good service as a masticator.

The dentist can use his judgment as to how much of the oxychloride to remove, the rivet being sufficient anchorage for his plug.

At first I thought this riveting would be an annoying operation, but it is only a pastime for a dentist used to difficulties. And the result is perfect.—E. C. RISHEL.

WHAT I KNOW ABOUT CELLULOID.—I have used it for nearly two years. I have no difficulty in making accurate fits. A plate now lies before me which has been worn about a year. It is still a perfect fit, showing neither warping nor shrinkage. I repair vulcanite plates with celluloid, attaching either single teeth or sections. I repair cracked plates thus: scrape thin along the line of fracture, leaving the plate thickest at the edges of the patch; drill holes the same as if using rubber, but larger where the plate is thickest; countersink on the palatine surface; lay in a piece of celluloid; heat up and screw flask together as usual, and find the patch firmly united to its place.—EXPERIMENTER.

"CELLULOID."—It does not seem that expressions are being made as decided in tone, with regard to the merits of celluloid, as my experience leads me to believe it is entitled to. Especially is this the case just now when so many must take up one or the other, and would be glad to decide adversely to rubber, if on no other ground than that of its impurities. I believe it is generally admitted that this material is pure enough for our purposes, also that it is elastic, very durable, and of an inviting color; last but not least, a better conductor of caloric, which fact is easily demonstrated to a certainty. Aside from all this in its favor, if there were any uncertainty of its being perfectly practical for all cases in the full sense of the word, of course it would have to be ruled out; but the fact is, you can count upon as certain results with this as with rubber, only it is necessary in manipulating it not to deviate from the requirements that its slight peculiarities demand.

You have essentially no new process or principle to learn in the use of this material; a few plain, simple rules that experience has taught will cover the entire ground. Your model must be hard; always carve out in the impression to form air-chamber on model, then you will know it cannot move when under pressure; mount your teeth as usual, but always use sheet wax or like substances for plates, to insure a uniform thickness, as the difference in that respect between the wax and celluloid plates must be looked after with more scrupulous care than any other part of the process, in order that there shall be a sufficient but not too great surplus of celluloid everywhere. *No grooves for surplusage are to be cut.* Learn to approximate your plate as near as you can to the required size (having your wax plate for a guide, for that purpose removing from flask as near whole as you can); with the aid of callipers to gauge, coarse-cut file, a fine saw in frame, you will be able to accomplish this quickly. Cover your model with pure tin foil, proceed as given in directions accompanying apparatus, only do not commence to turn down the screw with any force until ten or eleven minutes from time of lighting alcohol; after the screw is down, remove apparatus at once, blow off all steam, and place steamer at once in cold water, and let remain until perfectly cool; use acid to remove tin-foil from plate. It might naturally suggest itself, from the known tendency to crawl exhibited by this material, that reheating, as in mending, etc., might cause it to change form or in some degree recede from the teeth; not so: the new form it has assumed is permanent, and the reinvestment in plaster for mending is sufficient to keep it in place.

When a plate of the required color of gum can be had, by using plain teeth an opportunity presents to display taste in arranging them naturally, thus imitating continuous-gum work, and gaining much prestige thereby. I could say much more in favor of this material, but all these things will naturally unfold themselves to every one that makes celluloid their standby.—E. B. FAIRCHILD, D D.S., *New Haven*, *December* 29*th*, 1874.

DENTISTRY IN PRUSSIA.—I was somewhat surprised on reading in the DENTAL COSMOS for November the synopsis of Dr. W. C. Eastlack's paper entitled "Dentistry Abroad," sent to the American Dental Convention, and which treats of dentistry in Prussia. I should be sorry to have the members of the Convention think that their profession was so poorly practiced in Berlin as the "foreign secretary" would have them suppose. I think he is not so well qualified to judge as some others, as he has been in Europe not quite a year.

The writer was born in Berlin; studied medicine, and passed the examination here in 1863; studied dentistry, and graduated at the Baltimore College in 1865, and since 1866 has been practicing in Berlin, excepting the time during the war, when I had the honor of practicing as surgeon in the army.

Here, as in all large cities, there are good and poor operators, though Dr. Eastlack I should judge, has thus far seen only the work of the latter class.

Twenty-three years ago American dentistry was introduced into our city by representatives of the Baltimore College, and good, creditable work from their hands can be seen not only in Berlin, but in all of our provinces.

I am proud to be a Prussian citizen and dentist, and cannot feel satisfied to allow, without contradiction, the impression to remain which the foreign secretary of the American Dental Convention has made. I hope when Dr. Eastlack has seen a little more of dentistry in Prussia he will send a more favorable report. This he will be able to do when he gets a better class of patients.—J. PAETSCH, M D., D.D.S.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

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[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the Office of the Librarian of Congress at Washington.]

(Continued from page 76.)

The second of the remedies for sensitive dentine which may possibly endanger the pulp, is *chloride of zinc.*

It is probable that nothing employed for this purpose has elicited more discussion, or been productive of more varied results in different hands.

While many occupy a conservative position as to its value and the advisability of its use, a large number of practitioners and patients condemn it unsparingly; but again, we find an equal number of both, who extol it in the highest degree in the treatment of this troublesome form of disease.

The reason for this great diversity of opinion seems, evidently, to be the fact that chloride of zinc is a medicament which, among dental remedies, ranks high as a polychrest.

Its range is from the mildest detergent to the prompt devitalizer, and when we consider that between these we have every phase of purifier, tonic, astringent, stimulant, and irritant, it seems no longer strange that such varied results are attained from its indiscriminate employment. While these reflections should have full force, it must, however, not be forgotten that it is from this stand-point alone it can be understood how some one medicine can *best* meet the indications in a multitude of varied forms of trouble.

We award the highest meed of praise to that treatment which, *searching out and removing the cause of disease*, leaves, satisfactorily, to *nature* the work of restoration to health; but we must assign the next eminence to that which, with fewest remedies and least frequency and number of applications, meets the daily requirements of practice with the most unvarying success.

It is with this view that it is the persistent effort of dentists to make appliances in all directions, few in number and efficacious in their simplicity, and thus to condense within the limits of a dozen remedies the *ordinary* dental materia medica. while they cleanse, separate, excavate, file, and finish with their beautiful dental engines.

It has been recommended to use chloride of zinc in form of crystals, and in solutions of varied strength; but the characteristics pertaining to this salt lead to the conclusion, that in but *one* condition can it be regarded as an *accurate* application for sensitive dentine.

So long as it remains in crystals it is inert; if it could be maintained in crystal form, in contact with sensitive dentine, no result, in the direction of removing sensibility, would ensue; but it is a deliquescent salt, and thus, more or less rapidly, it becomes dissolved in the water of the atmosphere.

As *deliquesced chloride of zinc*, the salt is in solution with the least possible amount of water, and in this condition is most potent as a devitalizer.

As it cannot act unless deliquesced, it is useless to await its assumption of this form, by applying it as a crystal; and as it is most decided in its action when merely deliquesced, it is improper to deviate from this exact strength of solution *when it is to be applied for the removal of sensitiveness of dentine.* The addition of any water beyond this renders the solution irritant rather than devitalizing, and thus it is that just in proportion as we attain to absolute dryness of the cavity containing sensitive dentine, together with the maintenance of this condition, so are we successful in its employment.

I therefore recommend the use of the rubber dam whenever it is available, in connection with the application of chloride of zinc, with the assurance that compensating results are attainable by this method of insuring against the reduction of the strength of the solution.

It will be found that even with the utmost care as regards exclusion of moisture from the cavity of decay, and the most scrupulous exactitude as to strength of solution of chloride of zinc, it is usually a *painful application*, and it is in this connection, probably more than any other, that individual results are found to vary so decidedly.

Notwithstanding all precautions, if the zinc is applied without warning the patient of the probability of pain, and even of the possibility of intense pain, the exclamations of disapprobation, and even outcries from unexpected suffering, will disappoint the operator, and provoke aversion to its use; therefore all considerations should be fully and fairly weighed in the mind of the practitioner, that he may be able, in few words, to place them before the patient.

From many years of experience in the employment of chloride of zinc, I have become convinced that the aggregate of suffering is much lessened in cases which, in my judgment, demand its application, and, recognizing that I am therefore in the best possible condition for obtaining good results, I offer with greater hesitancy my testimony in its favor.

It is a fact, however, that in cases of sensitive dentine which will not yield to such treatment as has already been given, an amount of intense suffering is the concomitant of the proper preparation of a cavity, *which it is impossible for any one to appreciate who has not experienced it.*

It is quite generally recognized that even those who are heroic in every other direction, are quickly and completely *subdued* by suffering inflicted during operations upon their teeth ; but it is not until attention is directed to the *wonderful assistance to endurance* which is given by the act of *clinching the teeth* that it is realized that, inversely, a vast diminution of capability in this direction must result from the necessity for resistance with the mouth widely open.

It is not my province to enter into the physiology of this peculiarity of the special nerve of sensation to the teeth, with its masticatory, motor complication, in its evident connection with general sensation, but I have thought it eminently worth while to direct that attention to it which shall serve the purpose of stimulating such members of our profession as have not read and thought upon this matter, to so inform themselves as to be rationally responsive to interrogation upon a subject so peculiarly our own.

For this evident diminution of capability for endurance we should have a thoughtful care, and thus it behooves us to consider, in discussing chloride of zinc applications, the question of the relative effect of one or two possibly intense pains, in contradistinction to the infliction of the fifty, or a hundred, such touches as are necessary in the removal of sensitive dentine from any given cavity.

Again, the character of the pain is to be considered, for the power of endurance is not always in proportion to the intensity of infliction ; thus, the sensation of unbearable itching is *relieved* by severe bearable scratching, even to drawing of blood.

The sensation of touching exquisitely sensitive dentine is that of an unbearable shock, the frequent repetition of which unnerves one ; indeed, to many operators, it is almost as severe as to the patient, causing exhaustion of the former, just in proportion as the powers of endurance lessen on the part of the latter.

The pain from the application of chloride of zinc, though it be intense, is such as may be termed " bearable ;" it does not always supervene immediately upon the touch of the medicine, although it is usually quite prompt, and sometimes instantaneous; but whether it be quick or slow, intense or decidedly moderate, it comes in such a way as can be met without serious drain upon the resources of almost every capability for endurance, and the relief which is afforded during the subsequent excavation of the cavity is described by properly prepared patients in such terms as "admirable, wonderful, immense."

Method of preparing the Chloride of Zinc.—The salt is spread, in crystal form, over a shallow dish, as a saucer, and a few drops of water sprinkled upon it to hasten the commencement of deliquescence; it is then allowed to remain until nearly all fluid, when the supernatant clear liquid is poured off. This should be kept for use in a glass-stoppered bottle.

The taste of deliquesced chloride of zinc is that of a sweetish bitter metallic astringent; it is very persistent, and is generally quite disagreeable.

Method of Application.—Having so arranged with napkins or rubber as to dry and maintain dry the cavity, it is allowed to air dry for, perhaps, a minute, until the most superficial stratum of sensitive dentine becomes decidedly absorbent.

It is of very frequent occurrence that some pain is induced by this process, which is usually intimated by the patient.

A portion of oil of cloves, dropped from the point of a probe into the cavity, will usually quiet all irritation immediately; and, furthermore, although in these cases it will not so obtund as to admit of even the touch of the excavator, it nevertheless seems notably to modify the pain from the zinc application.

For this reason I habitually precede my zinc with oil of cloves, although no ache has been induced from drying, because, being impossible to prognose the action of chloride of zinc in any case, it is safer always to prepare for the worst; better prepare and have no cause than have cause and be unprepared.

Having allowed a few seconds for absorption of the oil, the superfluous amount is taken away by bibulous paper or other absorbent (except agaric, which from its nitrate of potash preparation induces cold and is apt to produce pain); the chloride of zinc is applied by means of a small pellet of bibulous paper saturated with the deliquesced zinc, or better, when practicable, by gently introducing into the cavity a loosely rolled pellet of bibulous paper, and then moistening it with a portion of the zinc from the end of a blunt probe.

By this method the shock, both thermal and medicinal, of a simultaneous application over the whole surface of decay, is prevented, and yet it is made with sufficient promptness to insure its action without any lengthy period of irritation.

The pain from an application of chloride of zinc is of all grades.

It is sometimes quite sudden and intense, but as if in compensation, when this is the case, its duration is usually quite limited; when the induction of pain is more gradual, it is generally much less severe, and is most frequently quite within the bounds of very bearable toothache, but the length of duration in these cases is ordinarily considerably greater.

We may regard it as an average result that an application which produces much pain will have a duration of from five to fifteen seconds, with a gradual diminution of intensity for the space of a minute or so, after which the pain subsides with tolerable promptness.

On the contrary, if a slow induction of moderate sensation results, we may naturally expect the continuance of an ache during three or five minutes, sometimes even more.

The pain produced from the action of this remedy, whether moderate or intense, should be *steady*, gradually increasing in power until its highest point is reached, and then as gradually and *steadily* diminishing, or, commencing at once with intensity, and, after a few seconds, following the same *steady* course of gradual diminution.

This is the usual result in cavities of "simple caries," but it will sometimes occur in these that there will be a change in the character of sensation, and, in place of steadiness, the patient will notice *pulsation*, which, however slight, denotes a certain degree of pulp irritation.

This modification of sensation can, of course, only be learned by questioning, and during the application of chloride of zinc this should be carefully attended to, the proper kind being indicated and the patient requested to notify immediately if any change takes place.

It will occasionally happen that patients will take the initiative in this, and, without questioning, will volunteer the information that the feeling is different, calling it a "beating," and to indicate its frequency will place the ends of the thumb and forefinger together and open and close them in exact rhythm with pulsation.

This pulp irritation is a matter of the utmost importance, and should be controlled immediately, by removing the chloride of zinc, gently drying out the cavity and introducing, upon cotton, either oil of cloves phénol sodique, or carbolic acid.

After a zinc application, due time should be given for whatever pain ensues to pass away, and yet no unnecessary delay should be permitted.

Immediately upon the cessation of pain, or, if pain is long continued, toward its final diminution, the devitalized dentine will be found in best condition for removal; and here again caution must be exercised in manipulation, for it is by no means, always, that the entire depth of sensitive dentine has been acted upon.

That which has been obtunded should then be removed, after which another application of chloride of zinc may be made. It is not often necessary to use as much precaution for the prevention of pain from a second application, except in favor of timid or really feeble patients, but with each repetition of zinc additional attention should be given toward guarding against pulp irritation.

This seems to be the only danger from the use of this remedy, for so far as the tooth structure is concerned, its action can be but superficial, as decomposition of the salt is simultaneous with the devitalization of dentine ; this alone precludes any untoward effect which might arise from its absorption, while the objection that the chlorine might act injuriously upon the lime salts, I have always viewed from results, as a chemical theory, rather than as a therapeutic practicality.

After sufficiently preparing a cavity in which it has been necessary to use chloride of zinc, it should be carefully washed out with pellets of paper or muslin dipped in warm water, after which thorough drying should be accomplished, the dentine then moistened with oil of cloves, and again dried, when it is ready for the introduction of the filling material.

(To be continued.)

THE PHYSICAL PROPERTIES AND PHYSIOLOGICAL ACTION OF DENTAL AMALGAMS.

BY E. A. BOGUE, M.D.

(Read before the New York Odontological Society, at the Special Meeting, December 14, 15, and 16, 1874.)

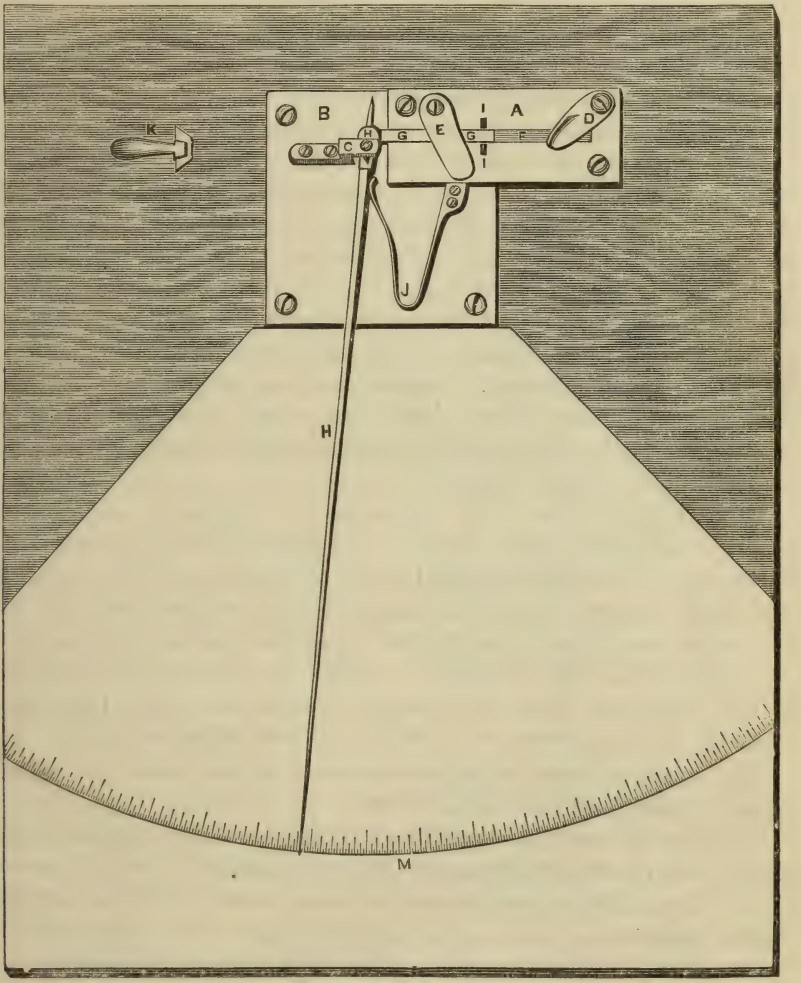
In my last communication before this society on the subject of "Amalgams," I expressed the opinion "that much more should be known in regard to these compounds, before they are generally adopted or rejected by the profession."

Since that time I have prosecuted still further some experiments looking toward the settlement of some of the questions that arise in connection with the use of amalgam fillings in the teeth.

As there is a large number of different alloys in common use, I selected twelve of those which have come most prominently to notice, and subjected them first to tests for linear contraction or expansion, in an instrument designed for the purpose ; but in view of the fact that the late Dr. Hitchcock was conducting a series of experiments on the physical properties of amalgams, my own researches in that direction have been only incidental, and must not be supposed to have been conducted with the same care as the experiments of Dr. Hitchcock.

Attention has been more particularly directed towards the mooted question, as to whether any of the ordinary amalgam fillings have any physiological action upon the human system.

With this object in view, I had a water-bath prepared, inside of another water-bath, that a perfectly uniform temperature might be



DESCRIPTION OF THE INSTRUMENT FOR MEASURING THE CONTRACTION OR EXPANSION OF DENTAL AMALGAMS.

A, a steel plate with a groove running from near *D*, at the right, to the end of the plate at the left, and being about one inch and three-quarters long. *II*, a slot exactly one inch from the right-hand end of the groove for the gate *K* to rest in while a filling, *F*, is being inserted. *GG*, a bar of polished steel sliding easily in the groove, one end of which rests against the filling *F*, and the other against the circular part of the pointer *H*. Beneath this steel plate is another, *B*, on which the pointer *H* is suspended at *C*, on two points like a compass-needle, that it may move freely. *J* is a light spring pressing the upper end of the pointer against the bar *G*, so that it will follow up the filling, *F*, in case of contraction. *E* and *D* are slides to hold the filling and bar down in their places, that no upward movement might be mistaken for a contraction. This apparatus is screwed to a mahogany board, and a paper scale arranged by means of microscope glasses, so that one degree of the scale at *M* equals one-thirty-six-hundreth of an inch at *F*.

maintained. To the inner bath was attached a thermometer, and beneath the outer bath was placed a Bunsen gas-burner. Into this apparatus forty-eight bottles at a time were placed, each containing a quarter of an ounce of saliva, and seven drops of one of the following acids,—nitric, hydrochloric, citric, and acetic; the two former being taken because they readily act upon most of the metals to be tested, and because used in medical practice, especially hydrochloric acid. The two latter were chosen because they are in constant use as food, and because their effect upon the teeth is supposed to be most deleterious.

Each amalgam, therefore, of the twelve, was placed under the influence of all four of these acids in the following manner: A tooth was excavated, and carefully filled, the filling being finished in the usual way, after hardening. This filled tooth, together with a pellet of the same amalgam as that contained in the tooth, which had first been soaked in saliva, then washed in clear water, and then weighed carefully to the $\frac{1}{10000}$th part of a gramme, was placed in the bottle of saliva, acidulated as before described, and kept at blood heat, or about 100°, for a little over three months, when teeth and pellets were removed from each bottle singly, washed in clear water, and once more carefully examined and weighed.

Upon the completion of the first series of experiments, as the acetic and citric acid tests did not seem to be severe enough to destroy the enamel of the teeth experimented upon, the fillings were filed down and burnished once more, and the little pellets were again weighed, and then each tooth with its pellet was dropped into a fluid, composed, in one bottle, of one-half saliva and the other half lemon juice, and in the other, of one-half saliva and one-half vinegar, and these were again placed in the water-bath, as before, at the same temperature, 100°.

The results of these experiments, so far as they have yet gone, I propose now to lay before this society.

In doing this, the composition of a number of the alloys will be stated; not the relative proportion of each constituent, nor the precise mode of manufacture, but enough for us to know with what materials we are working.

The same Roman letters and numbers throughout will designate all the experiments; the Roman letters, and not the name of the amalgam, having been the mode of designating them during the progress of the experiments, in order that there should be no bias for or against any individual specimen.

The numerals are arranged thus: No. 1, nitric acid; No. 2, acetic acid; No 3, citric acid; No. 4, hydrochloric acid.

The experiments began with

LAWRENCE'S AMALGAM, MARKED I., AND COMPOSED OF SILVER, TIN, AND COPPER. COPPER ONLY ABOUT 5.20 PER CENT.

The filling was put into the measuring instrument, February 23d, at

10 P.M. From this point onward I shall only copy the record in my books, kept for the purpose of registering the results.

Temperature of room, 74°.

Temperature of alloy, after handling, 77°; rise during amalgamation, $2\frac{1}{4}$°; packed in groove very dry, without washing, but having had the surplus mercury squeezed out; packed carefully without warming the instruments. In half an hour pointer indicated 2° of contraction. Left in same room for the night; very warm day, and room 74°. After washing with alcohol, put the rest into $\frac{1}{8}$-inch glass tube, held in the fingers, packing against wood plunger. Some squeezed by. Inverted it in a solution of indigo, in same room. After two days the pointer indicated 5° of contraction, which was not altered during a week.

Filling very brittle; broke into three pieces in removing from the measuring instrument.

Second trial. A little more mercury, other conditions being the same. Twenty-four hours gave $5\frac{1}{2}$° of contraction, ingot manifestly imperfect; filling in the tube admitted the indigo to about one-third its length. Filling quite hard and strong.

No. 1.—*Nitric acid test, after three months' insertion.*

Metal good color; tooth discolored around the edge of filling, but not badly; enamel not injured by the acid; cementum also uninjured, apparently; fluid quite offensive and turbid, of a brownish color. Pellet, original weight, 0.3157; after first test, 0.3198.

No. 2.—*Acetic acid test, three months.*

Fluid clear, offensive odor; enamel completely disintegrated, so as to be removed by the finger-nail for quite a depth; root soft and brown; color of the metal a little dark, but on the whole not bad; decay no worse at the margins of the filling than elsewhere; whole tooth covered with glistening crystals. Second test, one-half saliva, one-half vinegar, during ten days; enamel superficially disintegrated; roots much softened; filling slightly discolored, but not roughened; margins of filling good; no decay more than elsewhere over the entire tooth. Pellets, original weight, 0.3190; after first test, 0.3162; after second test, 0.3162.

No. 3.—*Citric acid test, three months.*

Fluid turbid and yellow, not very offensive; enamel not perceptibly affected; roots yellow, and quite a little softened; filling darkened, but not badly; no decay around the edges. Second test, one-half saliva, one-half lemon juice, during ten days; enamel so as to be removed by the finger-nail; root much softened; filling dark color, but not roughened; margins good; no discoloration. Pellets, original weight, 0.3257; after first test, 0.3257; after second test, 0.3257.

No. 4.—Hydrochloric acid test, three months.

Fluid clear, very offensive; enamel disintegrated over all the surface; root clear, yellow, somewhat softened, but not deeply; a few small crystals discernible on the roots; color of metal good, very little blackened; decay no worse at the margins of the filling than elsewhere. Pellet, original weight, 0.3325; after first test, 0.3330.

The teeth were then dropped into indigo for forty-eight hours, after which they were sawed open through the filling, one-half of which was removed to note the condition of filling and tooth. The blue color had run completely around three of the fillings, which were all large, and did not show defective margins before the teeth were cut open.

The next alloy tested was,—

RUBENCAME & BARKER'S DIAMOND AMALGAM, MARKED II., AND COMPOSED OF SILVER, TIN, GOLD, AND PLATINUM.

Put in the measuring instrument under the same conditions as the preceding. In five minutes the pointer began to move; in fifteen minutes it indicated a little more than 2° of contraction; next morning it showed a contraction of $5\frac{1}{2}°$, which was not varied from at the end of twenty-four hours. A filling in a glass tube, containing a larger proportion of mercury, did not show contraction; but the tube was held in the hand during its insertion. Teeth filled with it, and soaked in indigo after the tests of acids, had the blue color run around two fillings badly, one a little, and one not any. Filling rather hard, and very strong when fully set.

No. 1.—Nitric acid test, three months.

Fluid clear, not offensive; enamel badly disintegrated; roots yellow, somewhat softened; metal quite dark; edges of filling good; scarcely any more decay there than elsewhere; crystals in small numbers on the roots; fingers whitened with disintegrated tooth from handling; magnifying-glass used in nearly all of the examinations of the margins of the fillings. Pellet, original weight, 0.2938; after first test, 0.2942.

No. 2.—Acetic acid test, three months.

Fluid clear, slightly yellow, very offensive; enamel not affected, roots very slightly; filling very dark, but seemingly sound at the margins; tooth very dense. Second test for ten days, one-half saliva, one-half vinegar; enamel not much disintegrated; root somewhat softened; filling slightly discolored, but smooth; margins excellent. Pellets, original weight, 0.3120; after first test, 0 3120; after second test, 0.3122.

No. 3.—Citric acid test, three months.

Fluid turbid and yellow, not very offensive; enamel not affected; roots somewhat softened, and quite yellow; filling very slightly darkened: no decay perceptible at its margins. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, so as to be removable with finger-nail; root much softened; filling smooth, slightly darkened; margins good. Pellet, original weight, 0.3020; after first test, 0.3007; after second test, 0.3003.

No. 4.—Hydrochloric acid test, three months.

Fluid clear, slightly yellow, not very offensive; enamel entirely disintegrated over all its surface; roots yellow, much softened, and covered with crystals; filling very black, but seemingly perfect around the margins. Pellet, original weight, 0.2965; after first test, 0.2973.

JOHNSON & LUND'S EXTRA AMALGAM, MARKED III., AND COMPOSED OF SILVER, TIN, GOLD, PLATINUM, AND A TRACE OF CADMIUM.

Temperature of room when measurement was taken, 70°; no rise during amalgamation; pointer indicated 4½° of shrinkage in fifteen minutes; twenty-four hours later, pointer indicated 5°, after which no further change for some days; after a week or more, the pointer indicated 16° of shrinkage; filling pretty hard, and very strong when fully set; when soaked in indigo the blueing scarcely penetrated the edge of one filling, the others not at all; fillings pretty large.

No. 1.—Nitric acid test, three months.

Fluid clear, not offensive, strong of the acid; enamel much disintegrated; roots slightly so; filling a dirty brown, but clear underneath that surface; no more decay visible at the margins than elsewhere; filling quite soft, and evidently disintegrated on the surface. Pellet, original weight, 0.2922; after first test, 0.2920.

No. 2.—Acetic acid test, three months.

Fluid all evaporated; tooth somewhat disintegrated on one side; that same half of filling also roughened, and dull in color; no decay around the margins. Second test, ten days; one-half saliva, one-half vinegar; enamel not disintegrated; root much softened; filling bright and smooth; margins good. Pellet, original weight, 0.2607; after first test, 0.2613; after second test, 0.2610.

No. 3.—Citric acid test, three months.

Fluid all evaporated; tooth quite yellow; roots slightly softened; enamel bright and not affected; filling dark and rough, but bright beneath that surface; apparently not decayed around the margins. Second test, ten days; one-half saliva, one-half lemon juice; enamel disintegrated, superficially removable with finger-nail; root much softened; filling quite dark, but smooth; margins good. Pellet, original weight, 0.2678; after first test, 0.2685; after second test, 0.2680.

No. 4.—Hydrochloric acid test, three months.

Fluid clear, quite offensive; enamel a good deal disintegrated; roots slightly so; filling very dark brown, but clear beneath that surface; edges discolored; filling evidently disintegrated on surface, and quite soft. Pellet, original weight, 0.2752; after first test, 0.2752.

WALKER'S EXCELSIOR AMALGAM, MARKED IV., AND COMPOSED OF SILVER, TIN, GOLD, AND PLATINUM.

Measurement test, first trial, shrank in all 8°; second trial, packed dry without washing; amalgamated with great difficulty; packs badly; granular; temperature of room, 72°; amalgam shrank in fifteen minutes 3°; no further shrinkage perceptible for twenty-four hours, which ended the second test; filling not very hard, and quite brittle; when soaked in indigo the color scarcely penetrated at all around any of the plugs.

No. 1.—Nitric acid test, three months.

Fluid clear, not offensive; filling covered with crystals, few on roots; enamel much disintegrated, can be removed with the finger-nail; roots yellow, somewhat softened, not much; filling dark-brown on surface; bright immediately beneath; margins of filling, partly on enamel, partly on dentine, not more imperfect than the tooth elsewhere; filling soft, easily cut, much corroded on surface, and overlaid with a brown deposit. Pellet, original weight, 0.2813; after first test, 0.2827.

No. 2.—Acetic acid test, three months.

Fluid clear and bright; enamel apparently perfect; roots slightly softened; filling dark-brown on the surface, bright immediately underneath; darkened all around the filling, as we often see in the mouth. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; root softened; filling very slightly discolored, but smooth; margins good. Pellet, original weight, 0.3023; after first test, 0.3023; after second test, 0.3023.

No. 3.—Citric acid test, three months.

Fluid little yellow, rather offensive; enamel perfect; root but very slightly softened; filling very dark on the surface, bright immediately below; margins good; no decay or discoloration around them. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, can remove it with the finger-nail; root much softened; filling dark, and slightly roughened; margins fair. Pellet, original weight, 0.2877; after first test, 0.2875; after second test, 0.2870.

No. 4.—Hydrochloric acid test, three months.

Fluid clear, offensive odor; enamel quite decomposed superficially; roots softened somewhat, and apicial foramen much enlarged by solution; filling dark-brown on surface, bright underneath; perfect at margins, and not discolored beyond; surface of filling considerably corroded. Pellets, original weight, 0.3035; after first test, 0.3038.

HOLMES'S STAR AMALGAM, MARKED V., COMPOSED OF SILVER, TIN, AND GOLD.

In putting it into the measuring instrument, it was put in dry, without washing, and with as little mercury as would allow working; temperature of room, 70°; in fifteen minutes it shrank 3°; next morning it had shrunk to 5°; after that, for several days, no further shrinkage; works freely; takes up considerable mercury; filling quite hard, and rather strong; when soaked in indigo, the color penetrated only just below the margin of any of the plugs.

No. 1.—Nitric acid test, three months.

Fluid clear, not offensive; enamel much disintegrated; roots somewhat so; crystals on roots; filling dark, but clear; margins good; though the tooth itself is very defective, it showed no more decay around the filling than elsewhere; filling not corroded; still burnished, though dark. Pellet, original weight, 0 2962; after first test, 0.2978.

No. 2.—Acetic acid test, three months.

Fluid turbid, very offensive; enamel not affected; roots very little; filling very dark, bright just below the surface; margin good; no decay or discoloration. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; root much softened; filling bright and smooth; margins excellent. Pellet, original weight, 0.2788; after first test, 0.2792; after second test, 0.2795.

No. 3.—Citric acid test, three months.

Fluid quite offensive, slightly turbid, yellow in color; enamel unaffected; roots slightly softened; filling rather dark, but powder and stick makes it bright and clear again; margins of filling good; no decay or discoloration visible. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, and slightly soft under the finger-nail; roots much softened; filling slightly discolored, but smooth; margins excellent. Pellet, original weight, 0.2753; after first test, 0.2753; after second test, 0.2747.

No. 4.—Hydrochloric acid test, three months.

Fluid clear, offensive; enamel quite disintegrated; roots much softened; filling very black, bright just beneath the surface; margins all right; next the enamel seems a little decayed on the side toward the root; surface of filling quite rough, and superficially corroded. Pellets, original weight, 0.2973; after first test, 0.2980.

ARRINGTON'S NEW AMALGAM, MARKED VI., AND COMPOSED OF SILVER AND TIN.

Put into the measuring instrument with the temperature of room 74°; mixes easily; inserts with facility; pointer indicated 3° of contraction in six minutes; filling inserted rather soft; twenty-four hours later, pointer showed $4\frac{1}{2}$° of contraction, after which no further time was allowed. This amalgam is not hard, and is quite brittle when first put in; strong after fully set; when soaked in indigo, the color went all around one plug, around the margins only of two; one was not removed, but it seems colored.

No. 1.—Nitric acid test, three months.

Fluid somewhat turbid, not very offensive; enamel superficially disintegrated; roots yellow, softened, and the apex dissolved away; filling purple, color of dark watch-spring, but still polished bright beneath the surface; margins good, not decayed more than the rest of the tooth. Pellet, original weight, 0.5057; after first test, 0.3065.

No. 2.—Acetic acid test, three months.

Fluid clear, not very offensive; tooth untouched by the acid; filling as bright as when put in acid; margins perfect. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; root softened; filling bright and smooth; margins excellent. Pellet, original weight, 0 2965; after first test, 0.2965; after second test, 0.2965.

No. 3.—Citric acid test, three months.

Fluid clear, but yellow, rather offensive; enamel scarcely affected; roots slightly so; apex dissolved off; filling very black; margins perfect; no decay or discoloration of the tooth at margins. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated so as to be removable with the finger-nail; root much softened; filling dark but smooth; margins fair. Pellets, original weight, 0.2952; after first test, 0.2952; after second test, 0.2940.

No. 4.—Hydrochloric acid, three months.

Fluid clear, quite yellow, quite offensive; enamel much disintegrated; roots somewhat softened; filling lead color, smooth; margins good; filling seems to stand out at margins as though expanded. Pellets, original weight, 0.2637; after first test, 0.2653.

TOWNSEND'S AMALGAM, MARKED VII., AND COMPOSED OF SILVER AND TIN.

Filling put in the measuring instrument while the temperature of room was 72°; alloy mixes less easily with mercury than some others; forms a granular mass, unless very thoroughly mixed; put in quite stiff; packed well; pointer indicated 3° of contraction within ten minutes. Filled Dr. Hitchcock's machine at the same time, second mixing; after twenty-four hours pointer indicated 8½° of contraction. In Dr. Hitchcock's measurer the contraction was 3°; filling pretty hard, and quite strong when fully set; when soaked in indigo, the color went all around one plug, and around the margins only of three.

No. 1.—Nitric acid test, three months.

Fluid slightly yellow, not offensive, clear; enamel much disintegrated; roots somewhat softened; filling black, covered with crystals; blackness extends to quite a depth below the surface; margins apparently good. Pellets, original weight, 0.2665; after first test, 0.2678.

No. 2.—Acetic acid test, three months.

Fluid brownish-yellow, offensive; enamel not affected; roots slightly softened; filling copper color in the middle, mottled with black; tooth slightly discolored around the filling; very slightly discolored on the surface of filling; not very deep. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; roots softened; filling bright and smooth; margins good. Pellets, original weight, 0.2747; after first test, 0.2752; after second test, 0.2752.

No. 3.—Citric acid test, three months.

Fluid turbid, light yellow; odor bad; enamel unaffected; roots slightly softened; filling black; copper-colored spots under the glass, bright a little distance beneath the surface; margins seem pretty good, though not perfect. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, can remove it with the finger-nail; root softened; filling slightly discolored; margins poor. Pellets, original weight, 0.2955; after first test, 0.2958; after second test, 0.2960.

No. 4.—Hydrochloric acid test, three months.

Fluid clear, slightly yellow, not very offensive; enamel softened all over; roots very slightly; filling lead color, bright beneath the surface; margins good; superficial oxidation, with slight roughening. Pellets, original weight, 0.2835; after first test, 0.2840.

FLETCHER'S PLATINUM AND GOLD ALLOY, MARKED VIII., AND YIELDING UPON ASSAY THESE TWO DIFFERENT RESULTS: GOLD, 3.60; PLATINUM, 3.30; SILVER, 37.63; TIN, 55.47. GOLD, 5.10; SILVER, 39.50; TIN, 55.40; PLATINUM, NONE.

When measured, the temperature of the room was 72°; alloy amalgamates easily; packs well; requires but a small amount of mercury to get a plastic mass; mercury packs freely to the surface if in excess; the pointer, in fifteen minutes, indicated 2° of contraction in my instrument, and one-half of 1° in Dr. Hitchcock's; packed glass tube at same time, and dropped it into the colored solution at 100° F.; in twenty-four hours pointer showed no change in either instrument, having both been in the same room at about the same temperature, steadily day and night; filling quite hard and rather brittle; indigo did not penetrate around the margins of any of the plugs.

No. 1.—*Nitric acid test, three months.*

Fluid clear, not offensive; enamel much disintegrated, though superficially; root considerably softened; filling covered with crystals, quite black and rough; after scraping, was found bright and perfect at margins; no decay or discoloration of the tooth; filling considerably oxidized, but not deeply. Pellet, original weight, 0.2865; after first test, 0.2877.

No. 2.—*Acetic acid test, three months.*

Fluid turbid, quite offensive; enamel not affected; roots slightly discolored only; filling black; perfect around the margins; tooth not discolored. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; root softened; filling black, but smooth; margins good. Pellet, original weight, 0.2480; after first test, 0.2480; after second test, 0.2488.

No. 3.—*Citric acid test, three months.*

Fluid slightly yellow, and offensive; enamel not affected; roots slightly softened; filling lead color, bright just beneath the surface; margins perfect. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, can be removed by finger-nail; root softened; filling black, but smooth; margins good. Pellets, original weight, 0.2872; after first test, 0.2872; after second test, 0.2867.

No. 4.—*Hydrochloric acid test, three months.*

Fluid clear, not offensive, nearly evaporated; filling lay upward; enamel entirely soft on under side of tooth; root much softened; filling good and bright; margins perfect. Pellet, original weight, 0.2955; after first test, 0.2935.

Hood & Reynolds's Amalgam, marked IX., and composed of Silver, Tin, and Gold.

When put in the measuring instrument the temperature of the room was 74°; it amalgamates easily and smoothly with a moderate amount of mercury; packs easily; pointer indicated 2° of contraction in ten minutes after insertion; packed also a glass tube, which was dropped into the colored fluid in the water-bath at 100°; in twenty-four hours pointer showed 3° of shrinkage in my instrument, 1° in Dr. Hitchcock's; filling not hard, and rather brittle; indigo penetrated only just below the margins of the fillings.

No. 1.—Nitric acid test, three months.

Fluid turbid, yellow, offensive; enamel disintegrated all over; root softened; filling lead color, bright when burnished; margins good, without discoloration; filling pretty hard, but brittle. Pellet, original weight, 0.2838; after first test, 0.2850.

No. 2.—Acetic acid test, three months.

Fluid yellow, offensive; enamel not affected; roots scarcely; filling bright; margins good; tooth somewhat discolored around. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; root softened; filling slightly discolored, but smooth; margins perfect. Pellet, original weight, 0.3030; after first test, 0.3030; after second test, 0.3030.

No. 3.—Citric acid test, three months.

Fluid turbid, light yellow, odor sour; enamel not affected; roots softened and yellow; filling lead color, but smooth; margins perfect. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, can be removed with the finger-nail; root softened; filling dark, but smooth; margins good. Pellet, original weight, 0.2935; after first test, 0.2905; after second test, 0.2902.

No. 4.—Hydrochloric acid test, three months.

Fluid turbid and brown, offensive; enamel disintegrated all over; roots yellow and softened; filling black, but smooth; margins good, but filling seems started out from the cavity, as though expanded; filling hard and strong. Pellet, original weight, 0.3355; after first test, 0.3355.

COPPER AMALGAM, MARKED X., AND COMPOSED OF COPPER PRECIPITATED UPON MERCURY.

When put into the measurer, the temperature of room was 74°; it requires heating until the mercury is developed, then rubbing and packing; it packs easily, and becomes very hard, but black; the pointer stood, after six hours, in the same position it was placed in when the filling was put in; twenty-four hours later the pointer was in the same position, the filling having neither contracted nor expanded; indigo did not penetrate between filling and tooth in one case; the other was not removed.

No. 1.—Nitric acid test, three months.

Fluid green, nearly evaporated; enamel badly disintegrated; roots quite softened; filling green, black beneath that, bright still farther down; margin good; filling hard. Pellet, original weight, 0.2862; after first test, 0.2780.

No. 2.—Acetic acid test, three months.

Fluid green, not offensive, nearly evaporated; enamel not affected; root slightly so; filling black; margins green all around; seems close, however, even to the glass. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; root soft on surface; filling very dark; margins smooth. Pellet, original weight, 0.3197; after first test, 0.3190; after second test, 0.3137.

No. 3.—Citric acid test, three months.

Fluid clear, light green, odor sour, slightly; enamel not affected; root jet black, slightly softened; filling light lead color; margins good. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, can be removed by the finger-nail; root softened; filling dark, green on edge; margins good; no more decay than elsewhere.

No. 4.—Hydrochloric acid test, three months.

Fluid nearly evaporated, green, rather offensive; enamel disintegrated, and very green; roots very dark; green deposit on them; filling covered with brown crystals; below that, filling dissolved out, leaving a glistening surface; margins seem good.

PRECIPITATED PALLADIUM, MARKED XI.

Inserted in the measuring instrument with the temperature of room at 70°; amalgam sets so rapidly that no variations were noted; pointer did not move for fifteen minutes after filling was inserted; next morning it was found indicating 9° of expansion, and did not vary from that point for twenty-four hours; repeated the experiment with Dr. Hitchcock's machine; in removing the ingot from my measurer, I broke the filling into three or four pieces; it seemed to have really expanded; put a large amount into Dr. Hitchcock's measurer, and in twenty-four hours the pointer indicated 15° of expansion by his scale; filling very hard and brittle, like glass; little elasticity about it; indigo did not go around one plug, the other was in a dry tooth which soaked.

No. 1.—Nitric acid test, three months.

Fluid clear, slightly yellow, slightly offensive; enamel much disintegrated; root yellow and softened; filling lead color. Pellet, original weight, 0.3622; after first test, 0.3617.

No. 2.—Acetic acid test, three months.

Fluid yellow, disagreeable; tooth not acted on; filling dark lead color; hard and bright just below the surface. Second test, ten days, one-half saliva, one-half vinegar; enamel slightly soft; can be removed with an excavator; root softened; filling dark; margins perfect. Pellet, original weight, 0.3562; after first test, 0.3563; after second test, 0.3562.

No. 3.—*Citric acid test, three months.*

Fluid clear yellow, brown sediment; enamel not affected; root dark brown; filling nearly lead color, but hard and clear just below the surface. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, can be removed with the finger-nail; root softened; filling very dark; margins good. Pellet, original weight, 0 2572; after first test, 0.2267; after second test, 0.2267.

No. 4.—*Hydrochloric acid test, three months.*

Fluid yellowish brown, not very offensive; enamel somewhat softened; roots dark brown, slightly soft; filling dark lead color, hard and bright beneath the surface. Pellet, original weight, 0.3343; after first test, 0.3318.

PRECIPITATED SILVER, MARKED XII.

Put in measurer with temperature of room at 74°; precipitate does not amalgamate easily, and takes up a large comparative amount of mercury; packs with difficulty, and shows a tendency to rise or move from the sides of the trough; after five hours, showed one-half of 1° of shrinkage in Dr. Hitchcock's instrument; makes a very hard and strong filling when set; next morning, showed 8° of expansion; after twenty-four hours, showed 20° of expansion; indigo barely penetrated around the margins of the fillings.

No. 1.—*Nitric acid test, three months.*

Fluid turbid, yellowish, offensive; enamel superficially disintegrated; roots slightly softened; filling bright and hard; margins perfect; no discoloration. Pellet, original weight, 0.3050; after first test, 0.3052.

No. 2.—*Acetic acid test, three months.*

Fluid yellowish, offensive; enamel not affected; root blackened; filling fairly bright; margins good; tooth not discolored at margins. Second test, ten days, one-half saliva, one-half vinegar; enamel not disintegrated; root very soft; filling very bright; margins good. Pellet, original weight, 0.2840; after first test, 0.2838; after second test, 0.2838.

No 3.—*Citric acid test, three months.*

Fluid clear, very offensive; enamel not affected; roots quite brown; apex dissolved off and somewhat soft; filling bright, hard, clear, and perfect at margins. Second test, ten days, one-half saliva, one-half lemon juice; enamel disintegrated, can be removed by the finger-nail; root soft; filling very bright; margins good. Pellet, original weight, 0.3535; after first test, 0.3535; after second test, 0.3535.

No. 4.—Hydrochloric acid test, three months.

Fluid dark brown, very offensive; enamel all soft; root dirty brown, and quite soft; worst looking tooth, save one, in the whole lot; filling bright and clear; margins raised, as though expansion had taken place; decay same as elsewhere. Pellet, original weight, 0.3383; after first test, 0.3388.

Fletcher's Expanding Amalgam works soft and amalgamates easily; takes up a large proportion of mercury; works as though it contained palladium; temperature of room 73°; pointer showed 2½° of shrinkage in one-quarter hour; in twenty-four hours, 7½° of shrinkage.

Hood's cheap Amalgam works easily and packs well, and showed in Dr. Hitchcock's instrument 1½° of shrinkage in fifteen minutes, and in twenty-four hours 1° of shrinkage; in three days, 18° of shrinkage. No further experiment made with it.

What, now, is the practical value of this mass of experiments, with all these carefully kept records; and is the knowledge worth the expenditure of one-hundredth part of the time and labor it has cost? In the *Chicago Medical Journal* for July, 1873, is an article by Dr. Payne, in which he gravely speaks of the "poisoning of thousands of people all over the world from corrosive sublimate generated in the mouth from amalgam plugs in the teeth." And he says that "neither Asiatic cholera, nor smallpox, nor any malarious disease, is doing half the mischief in the world that is done by this poisoning." Is there any ground for this statement?

Dr. Cutler says "that protoxide of mercury is the only deleterious oxide of consequence, and that in order to get it, mercury must be heated up to 600°, with free access of air; then red precipitate is formed, which is the protoxide, and on raising the heat higher, this oxide is again decomposed into the simple elements.

"To form calomel, which is a subchloride, subnitrate of mercury is precipitated by common salt; it is also formed by other processes. Protochloride of mercury, or corrosive sublimate, may be made in several ways. When metallic mercury is heated in chlorine gas, it takes fire and burns, producing this salt.

"From the above formulæ it will be seen that mercury is not readily acted upon by any fluids that may exist in the mouth, as these fluids always contain at least from eight hundred to nine hundred parts of water in one thousand parts, so that any acid, or any other agent contained in this fluid, could absolutely have no action of any moment; so that all the apprehension that we need have in connection with amalgam fillings, is from the vaporization of the mercury during the process of hardening."

I think I may venture to add to Dr. Cutler's remarks, that any mercury that vaporizes in the temperature of the mouth would remain vaporized, and pass out by the expiration as it went in, "a vapor."

But discussion does not establish a truth; only demonstration can do that. These tests, therefore, were needed to enable us as a profession to say positively whether or not the mercury in an amalgam filling, or any number of amalgam fillings, properly inserted, could, by any possibility, cause mercurial symptoms, or cause mercurial poisoning with unrecognizable symptoms. And, as has been shown, three months and over of chemical action so severe as to almost completely disintegrate or dissolve the enamel of most of the teeth subjected to the tests, has failed to diminish the aggregate weight of the amalgam pellets, that were subjected to the same tests as the teeth with their fillings, more than about 3 grs., in nearly 11½ dwts. That is to say, the gain from the addition of oxygen by the oxidation of the surface of certain pellets has nearly balanced the loss of weight of certain other pellets, so that the pellets now weigh in the aggregate only about 3 grs. less than at the beginning of the experiments, the copper being the greatest loser; and copper amalgam is not used in this country, though it is in Germany.

To complete the statement, the fluids in which these teeth and amalgams have been lying in corruption together have been carefully tested for mercury, not only by myself, but in the chemical laboratory of Columbia College School of Mines, under the supervision of Prof. Chandler, and his report and certificate is appended hereto.

"NEW YORK, DEC. 12th, 1874.
"*Laboratory of the School of Mines, Columbia College, cor. 49th St. and 4th Ave.*

"*Certificate of Analysis.*

"SIR,—The samples of saliva in which various alloys had been digested, submitted to me for examination, contain no mercury in solution.

"Respectfully, your obedient servant,
"C. F. CHANDLER, PH.D.,
"*Professor of Analytical and Applied Chemistry.*

"To DR. E. A. BOGUE,
"29 East 20th St., City."

So much for the effects of amalgam fillings upon the human system.

Now for a few observations upon the mechanical or physical properties of these various alloys.

We notice, in the first place, that there is but little variation in the shrinkage of those that shrink, the largest amount being 8½°,—about $\frac{1}{424}$th of an inch; and the smallest amount being 2°,—about $\frac{1}{1300}$th of an inch; provided our instruments are correctly made; while the two that expand permanently, expand, the one, palladium, 9°, and the other, pure silver, 20°.

We have here a clue to the bulging out often apparent after the filling was finished, of the old amalgams made of coin filings.

A noticeable thing in the experiments with the acids, was the apparently good margins of nearly all the fillings.

To carry still further positive knowledge on that point, I dropped all these teeth, wet with saliva as they had been for months, into a solution of indigo, which was placed in the water-bath at 100°. After lying for two days in that blue fluid, I took them out, cut them open through the filling, and have attached to each a label showing which amalgam was used, and what action it had been subjected to. These teeth can be examined by the gentlemen present.

It will be seen that, if almost any amalgam is used intelligently, teeth can be filled so as not only to preserve them, but to do so without danger to the general health from any element of the filling, unless it be copper. Of that I am not sure.

ON THE ULTIMATE SUPPRESSION OF THE TEETH IN MAN. WILL THE COMING MAN BE TOOTHLESS?

BY A. H. THOMPSON, D.D.S., TOPEKA, KANSAS.

It is a cardinal principle of the hypothesis of evolution that *use* strengthens and develops, and *disuse* weakens and destroys; that the growth and development of an organ is in direct ratio to the extent of its employment, and that an organ in disuse becomes atrophied, is suppressed to a mere rudiment, and is, perhaps, finally aborted. The law is of universal prevalence and of marked certainty of effect. It is exhibited in the internal organization of all animals where use or disuse through altered habits has made corresponding impressions of development or suppression.

The principle is applicable to the study of the development, the evolution, and conditions of the dental organism in animals, considered in its true relation to the economy, as part of the alimentary tract and of the digestive system. The utility of the teeth to the general system is the one cause and object of their presence, and that their importance is great is indicated by nature by the complicated framework and environments of bone and soft tissue erected for their accommodation. Yet their value is only utilitarian, and developed originally by virtue of the necessity for their existence to subserve a purpose and perform a work; they are sustained alone by the continuance of the necessity, and with its cessation must succumb to the doom of useless things and be expelled. In their utility to the animal economy the teeth serve but two purposes, viz., (1) prehension and (2) mastication.

(1) As prehensory organs, the value of the teeth is great to many of the lower forms (for battle, as "secondary sexual organs," and the prehension of food), but in the higher animals (the quadrumana) the teeth have been superseded by the evolution of prehensile limbs, and the consequent suppression of this function in the teeth. In man we find the prehensory teeth suppressed to mere rudiments of former formidable and useful weapons, being reduced to the merest purpose for the prehension of food, and are utterly aborted as "secondary sexual organs." This is a fact that cannot be mistaken, and is full of significance.

(2) In man the teeth still retain the second function, of mastication, and are important to the economy. They are sustained in this function by the necessity for its performance, but that this is gradually disappearing before a modification of the habits of man concerning his food is equally true; and concurrent with the latter fact, in agreement with well-known law, the teeth will be suppressed and finally aborted by the disappearance of the necessity for their existence, which alone sustains them. That the law is active in the case of the dental organs is illustrated by lower forms, as the *Cetacea*, *Edentata*, *Ruminantia*, etc., where disuse (modified and controlled always by natural selection) has induced the suppression of certain teeth, working its effect through preceding generations upon their production and maintenance. The demand of the latter upon the animal system is a severe drain, and that natural selection would accelerate their suppression through "economy of growth," as soon as disuse would signal permission, there seems no doubt, as the economy would be great. In the case of man, we may say that this action is in advance of the subsidence of the use of mastication, acting in anticipation, and while nature has suspended conservation as if permitting it.

The causes effecting these changes may be traced in (1) the modification of habits concerning his food before and since man entered upon civilization, (2) the consequent gradual disuse of mastication, (3) the corresponding structural degeneracy of the teeth, and (4) weakening of their supporting environments.

(1) The change of habits concerning food may be noted as the primary and active cause of the degeneration of the teeth in man. Within the memory of the race the food has undergone marked and wonderful alterations. From the coarse, tough, uncooked food of primitive man it has been evolved and elaborated gradually into the refined, chemically-prepared viands that tempt us to-day. And that this will continue till mastication shall be dispensed with, and the occupation of the teeth be gone, there seems little doubt.

(2) The cooking and softening of the food had its direct effect upon the labor of mastication, inducing indisposition which was transmitted along with increasing incapacity. And it seems to-day, that the func-

tion is being discarded more rapidly by inclination than by necessity, and this will react upon the development of prepared food by creating demand for it, by the disappearance of the function.

(3) Structural degeneracy of the teeth dates from the first compromise of original habits which committed them to disease, and has continued to increase in irregular ratio to rapid alteration of habits, accelerated by natural selection. To the innovation of soft, cooked food may be accredited the prevalence of dental diseases to-day. This deterioration of structure is the direct effect of natural selection in anticipation of final suppression, by the law of economy of growth, acting, possibly, in advance of demand, upon the intimation of gradual disuse. Thus, the suppression of the teeth in man may be effected by a process differing from that employed in lower animals, being subject to modification by habits.

(4) The weakening of the supporting environments of the teeth is caused by the gradual disuse of mastication. The alveoli are becoming less perfectly formed and developed, the masticatory muscles less strong and firm, and the maxillary bones are smaller and weaker; in fact, all the masticating machinery is gradually becoming incapable. Mr. Herbert Spencer has said that "with savages the greater use of the jaws in chewing coarse, uncooked food, would act in a direct manner on the masticatory muscles and on the bones to which they are attached," and naturally following, disuse would produce an opposite effect.

The possibility of the susceptibility of the teeth to suppression and final abolition can be readily granted by the physiologist. The facts that it has occurred in lower forms (indicated by reversion where teeth have been found in fœtal whales and premaxillaries of calves), their occasional anticipatory suppression in man as a frequent occurrence (and often as an hereditary peculiarity), the occasional reversion to the reproduction of (supernumerary and now rudimentary) teeth which were once complementary in lower forms, and other exhibitions of variation, indicate the ability of the economy to alter existing conditions. This is supported by the structural relation of the teeth to the tissues that contain them, in that they are not true bone, but are of epithelial origin, and susceptible of being expelled without inconvenience.

The case of the wisdom-tooth in man furnishes us with some evidence in point, and it is interesting to note that we are here the contemporary witnesses of the process of suppression of an organ to a rudiment with a tendency to its abortion.

Disuse (1) and natural selection (2) are here actively at work under our very eyes. The progress that has been made in the *Anthropoidea* in the suppression of this tooth is manifestly of the kind that will result in its final and perhaps speedy abolishment. As Mr. Darwin says, "It appears as if the posterior or wisdom-tooth were tending to become rudimentary in the more civilized races of men. These teeth are rather smaller than the other molars, as is likewise the case with the corresponding teeth in the chimpanzee and orang." But in the lower quadrumana we know that the tooth is complementary, and is as complete in structure and support as its fellows. Again: "They do not cut through the gum till about the seventeenth year, and I am assured by dentists that they are much more liable to decay and are earlier lost than the other teeth. It is also remarked that they are much more liable to vary both in structure and in the period of their development than the other teeth." The degeneracy of this tooth can thus be traced from the higher apes to contemporary man to-day, making a long history of gradual deterioration and suppression. Yet in many of the lower races of man, as indeed with individuals and families among civilized men, this tooth possesses a serviceable structure and durability, but its structural integrity is at all times below that of the other teeth in the same denture.

(1) Disuse has performed an active part in reducing this tooth, for it seems that it follows a known law, that "disuse at that period of life when an organ is chiefly used, and this is generally during maturity, together with inheritance at a corresponding period of life, seem to have been the chief agents in causing organs to become rudimentary." Quoting again: "Disuse has led in successive generations to the gradual reduction of various organs until they have become rudimentary."

(2) But yet, at present it appears as if natural selection was the most active agency employed against this tooth, for the reason that disuse may be said to have "had its day," and that the tooth being in the average individual practically useless, and decidedly injurious to the economy, natural selection is hasting its abolition on the law of "compensation and economy of growth." A difference between races is found in the fact that "the posterior dental portion of the jaw is always shortened in those that are civilized, and this shortening may, I presume," says Mr. Darwin, "be safely attributed to civilized men habitually feeding on soft, cooked food, and thus using their jaws less;" disuse being here the primary cause of suspension of the environments, leading to injury to the parts by the presence of the tooth which natural selection is engaged in correcting, by the abolition of the injurious organ,—*i.e.* being "reduced by natural selection by having become injurious to the species under changed conditions of life." This acts also in the economy of growth in the structure of the tooth, rendering it more liable to disease, and its often late and irregular eruption indicating a tendency to suppression, due to non-development or rudimentary retention in the jaw.

From analogy we may possibly expect suppression of all the teeth with final abortion, although the methods of accomplishing this may differ somewhat from those employed in the destruction of the wisdom-tooth. But that there is a tendency to the final abolition of the teeth in man seems demonstrated by the few facts here suggested without attempted elaboration, as well as by many that we cannot cite at this time.

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GOLD.

BY DR. G. V. BLACK, JERSEYVILLE, ILLINOIS.

(Read before the New York Odontological Society at the Special Meeting, December 14, 15, 16, 1874.)

Gentlemen of the New York Odontological Society :

Your committee have seen fit to invite me to prepare a paper for your society, naming as the subject, "Gold." While I have an ever-wakeful interest in the welfare and progress of my chosen profession, in the study and practice of which I am spending the best energies of my life, and am always willing to contribute my mite when called upon, I cannot but feel that the committee, in making their choice, have passed by very many men who are far better able both to interest you and benefit the profession. I will nevertheless attempt to say something of the laws governing the welding of metals, which I hope may not be without interest and substantial benefit to some of you in the development and management of that wonderful property in gold, as we use it in our daily practice.

Leaving the history of the development of our understanding and use of this property of gold to those who have preceded me, I will simply remind you that the great mass of dentists now in practice depend upon the welding property of their gold for the permanence of their work. This thought is sufficient to show that too great an importance cannot well be attached to its study. In this study we have to deal, as you will presently see, with the most subtle and hidden chemical affinities known to science; and in order that we may start at the best point to gain an understanding of these forces, we will refer to some familiar experiments.

If a piece of fine platinum sponge be prepared, strongly annealed, and allowed to cool, and then held in a jet of hydrogen gas, it will be heated to redness, and the gas ignited.* This result is explained in this wise. When the platinum sponge is held in the jet of hydrogen, the gas condenses upon the metal and within its pores with such great rapidity that, its latent heat becoming sensible heat, the sponge is heated to incandescense and the gas ignited.

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* Regnault's Chemistry.

Again, if we introduce the prepared sponge into a mixture of hydrogen and oxygen gases, the mixture will be exploded;* but if the spongy platinum be mixed with some substance to modify the rapidity of the condensation, its pores will fill with water.† In this case both the hydrogen and oxygen are strongly attracted to the metal; and in condensing upon it, their affinities are so excited that they combine and form the water that fills the sponge. In neither of these instances does either of these elements unite with the platinum, or change it in any degree, while they cannot unaided form a chemical union with the platinum; yet there is a subtle affinity existing between them which causes these elements to condense upon the surface of the metal, and adhere with great tenacity until this attraction is overcome by a powerful heat. By a long course of experiments we have shown that similar phenomena, but less marked, take place with all the noble metals, and are almost certainly found with metals of the baser sort, as a preparatory step to the formation of oxides, etc.; the metals differing from each other in attracting this gas, or that, more strongly than another.

In order to prove that this is true of gold, roll several sheets of pure gold foil into a loose rope, anneal, and suspend them in sulphureted hydrogen gas for a few hours, after which suspend them in ammoniacal gas, or drop them in the liquid ammonia, and carefully dry without heat. Now re-anneal this rope, holding a cold porcelain slab directly over it, and a sublimate will be collected, which proves to be sulphuret of ammonium. If this experiment be varied by substituting chlorine for the sulphureted hydrogen, a much larger amount of sublimate will be collected, which is the chloride of ammonium. This case is chemically identical with the experiment with the platinum in which the water is formed, the only difference being in the elements employed. I might give you a greater variety of these interesting experiments with gold, and different gaseous elements, or with other metals, but, as our space must be limited, this must suffice as illustrating the laws of this exceedingly subtle affinity, which we have found to be as varied and complex as the more prominent and complete affinities of the elements.

Now, I wish to draw your attention to a remarkable circumstance that unerringly accompanies the last and similar experiments. When the rope of gold was annealed preparatory to being placed in the sulphureted hydrogen gas, its welding property was developed, and it might be welded perfectly and solidly together; but when removed from that gas, that property has entirely disappeared. It will not weld any more than so much tissue-paper. The same thing happens if the gold be placed in a bath of ammoniacal gas, hydrogen, illuminating gas, phosphorated hydrogen, sulphurous acid gas, and a great variety of others,—in fact, in any gas that is attracted to and condensed upon gold, the effect being more or less perfect according to the power of this peculiar affinity in any particular case.

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* Regnault's Chemistry. † Gray's Chemistry.

Now, why the loss of the welding property? The answer is simple—the gas is condensed upon, and covers the surface of, the metal, and prevents its particles from coming into actual contact, or within the sphere of their mutual attraction. It cannot be seen by the mortal eye, nor be detected by the ordinary tests for the purity of the metal, but such experiments as those given above reveal it unerringly, and render it appreciable to our senses. After close experimental study of these phenomena with gold and other metals, we believe ourselves warranted in saying that all metals are welding metals, whether cold or hot, if the particles come in contact Therefore, any metal that is capable of being made actually clean, its surface free from combinations with or condensations of other substances, will readily weld. In other words, if the particles of a given metal are brought into contact, they cohere. This is the secret of the success of using fluxes in soldering and welding by heat. By using a substance that will dissolve and remove oxides formed, and exclude that element, yet adhere to the metal with but little tenacity, so that it is easily thrust aside by the blows of the hammer or the superior affinity of the flowing metal, the particles come into contact, and union results. It also explains those cases of accidental cold or nearly cold welding, causing the sudden stoppage of machinery, especially heavy stones, buggy-wheels running upon iron axles, and so forth. I have examined a number of these cases where a very perfect weld had taken place over a considerable portion of the surfaces in contact. The attrition had worn away the prominences, and perfectly cleaned the surfaces, until a considerable extent of surface had come into actual contact, and a weld was the result.

I have also been able to produce this result in the machine shop, and thus study its phenomena. This mode of cold welding with iron and steel is, however, entirely impracticable for ordinary mechanical purposes, and this must evidently be the case with any metal that condenses oxygen, for the reason that that element is always free in our atmosphere. This property of condensing oxygen effectually prevents our using the welding property of platinum foil for the purpose of filling teeth, for it requires a white heat to clean it perfectly, and before it is cold the oxygen of the air begins again to condense upon it, obscuring its welding property. If, however, the platinum foil should be covered with ever so thin a lamina of gold, but sufficient to protect it from oxygen, I have no doubt but that it may be readily welded, though I have never tried it. It would probably be necessary to work quite rapidly, so that the surface of the platinum should not be long exposed to the air; otherwise the weld would certainly be lost. The secret of the welding of gold, cold, lies in the fact that it does not attract or condense oxygen; and nitrogen (the other element of our atmosphere, which some poetical chemist has characterized as "that slothful element that never knew a passion, neither of hate, nor yet of love") is, I believe, not attracted by any of the metals. Therefore, gold does not lose its welding property in pure air, or if so, it is only after many days, and then, we believe, it is always from the condensation of carbonic acid gas, which is always present in small quantities, and is attracted to gold quite feebly, but with sufficient power to remove the welding property promptly if placed in the pure gas. Therefore, gold left exposed to the ordinary atmosphere loses this property in a few days; but it may be retained for a great while by very close wrapping. The effect of annealing, so far as the development of the welding property is concerned, is simply the cleansing of its surface by driving off any of the volatile gases that may be condensed upon it. This is a very different effect from that of softening gold plate by annealing. The softened plate is not again hardened by exposure to the air, or any of its impurities, while the welding property is so lost.

The welding property is not necessarily lost by hammering, or even burnishing, while its softness is inevitably lost. Therefore, these two effects of heat are entirely different in their nature; the one cleans the surface, while the other probably causes a repolarization of the atoms. I should probably state that, by hammering gold, the power of the weld is weakened in proportion to the weakening of the general cohesion of the atoms of the mass. It is well known to workers in gold that it may be hammered till it becomes very frail and brittle; and its particles, having lost partially their cohesion or attraction for each other, will of course have lost in the same degree their attraction for fresh masses, and the weld will be weakened to this extent. It is therefore injurious to continue malleting our fillings after all spaces are closed.

These gases, in escaping from our gold in the flame of the annealing lamp, often cause a peculiar appearance which most of you, no doubt, have occasionally noticed. I have often heard operators say that their gold smoked, or that it colored the flame of the lamp. The escape of some of the gaseous elements, and combinations in a pure alcohol flame, are extremely beautiful, among which chlorine deserves especial mention. These phenomena should be observed in a dark room. We have so far spoken of these condensations as being readily driven off by heat, after which the welding property is completely restored. With gold, this is true of all but two groups, those formed from sulphur and phosphorus. Any gas into which either of these elements enters is liable to become so rigidly attached to the gold that it cannot be perfectly removed by annealing, and the welding property of the foil cannot be redeveloped. Therefore, if we would keep our gold in condition to use the welding property, it must be protected from these elements in all their forms. Simple close wrapping does not always suffice, for I have known a number of instances of gold being ruined when quite closely wrapped; and, again, it may be much injured while being prepared for use, or even while on the operator's tray; for it sometimes happens that these results are produced quite suddenly. Though, as these gases are usually found diluted in the air, it generally requires some time for them to become so firmly fixed as to make the loss of the welding property irreparable, yet every operator should be (as I suppose most of us are) especially careful that these gases are not generated in or about his office,. from decaying blood in a neglected spittoon, decaying flesh, old teeth, badly-arranged sewer connections, etc.; in a word, he who handles gold should be *clean.* Especially would we warn operators to have a care in the use of friction-matches; for every match that is lighted evolves both sulphur and phosphorus fumes, and gold is often injured by them, even when its welding property is not wholly destroyed; especially is this the case when a small portion of phosphorus happens to be detached from the match and lodged upon the wick of an alcohol lamp, which, being surrounded by the flame, does not at once burn, but slowly exhales its fumes to light upon the gold as it is being annealed; for the fumes of this element will attach themselves to gold when it is very hot, especially when just taking the form of phosphoric acid, which is now volatile at the annealing heat. That the gold may be injured so as to endanger our work when the welding property is not entirely destroyed, we can probably make clearer by referring to some things that are more patent to the eye.

You have doubtless all noticed that, when a bright surface of any metal is corroded, it almost uniformly happens that the first traces of rust appear at small points, which gradually spread until the whole surface is covered. Now, just the same thing happens in the condensation of the gaseous elements upon the metals, and thus it happens that the welding property is first lost in little spots, while the rest of the surface will weld. This may be proven by close examination of the gold itself as to the welding at different small points of surface; and also by closely watching it during the condensation of those elements that discolor it. This phenomenon may be seen by exposing the gold to ordinary illuminating gas, or others of the carbon group. This is sufficient to show us that when these condensations take place slowly they tend to radiate from centers, which, in some degree, remind us of the points of commencing crystallization. This phenomenon is the one of great danger to us in using gold in filling teeth, for if the welding property is entirely removed, we will not use it; but if most of the surface is in fair condition, we are apt to proceed, though we may even notice that some points do not adhere well, and thus turn off fillings that are imperfect, perhaps to mortify us in a few months or years with their rough surfaces and ragged margins. If gold is to be welded at all, it should be perfectly welded, so that if we take a sharp chisel and pare off a shaving, it will not break or crumble, but will curl up as one pared from the ingot, which is always easy if the foil be in perfect condition. If it is to be used soft, let it be actually non-welding, and each portion be so placed as to be held in position by another portion by wedging, as we used to do in years gone by; for then we know what we do, and can depend upon the result, while, if we attempt to make it weld, and fail, disaster must follow.

Now, as to the protection of gold from these evil influences,—close care in keeping it well excluded from the air is very generally successful, and the effect of such care has been long understood, and practiced with good results. Notwithstanding this, the remark, that "my gold is not working first-rate to-day," is often heard, and it has long been understood that atmospheric changes had something to do in the matter. Just what those atmospheric changes may be which cause our gold to work badly to-day, and passing away allow it to work well to-morrow, is not yet fully understood; for the condensations of which we have spoken do not pass off of themselves. True, the effects of acid compounds are neutralized by alkaline compounds; the affinities in this case being the stronger, the attraction to gold is overcome, which accounts for many changes in condition; yet, in my experiments of leaving gold in the open air in different changes of weather, I find it difficult to explain all the variations of condition in this way, and there are grounds for supposing that ozone may have something to do with it; but this peculiar substance—or state of oxygen, if you prefer the phrase—is very difficult to experiment with, and my efforts have not been satisfactory. It seems true, however, that ammonia will protect gold from all those gases into which those elements which produce permanent injury enter; partly, perhaps, by its previous occupancy of its surface, but principally by combining with them to form harmless salts. Therefore, so long as the gold-drawer is kept scented with ammonia, the gold is safe from all harm, and will work each day equally well, no matter what the weather or condition of the atmosphere. This fact I have had occasion to put to the severest practical tests. About eight years ago I arranged a chemical laboratory adjacent to my operating-room, in which classes recited on certain evenings, and a great variety of experiments were performed for their benefit. Every now and then I found that the welding property of my gold had disappeared, and finally suspected that fumes from this laboratory had some connection with the mischief. I set about an investigation. And a few experiments in exposing gold to this gas, and that with effects that surprised me at every step, awakened an interest in the subject which kept my spare hours engaged for many months, which developed the facts and theories given here, and in a paper presented to my own State society in the year 1869, and published in the July number of the *Missouri Dental Journal* of that year; also republished in the *Dental Times*, and *American Journal of Dental Science*, somewhat later in the year, to which those wishing details in regard to performing these experiments are referred. Now, after this investigation, classes continued their recitations as before. My gold-drawer was kept scented with ammonia, and no more gold was injured. We had discovered the true source of trouble, and a successful remedy that has never yet failed us. This ammoniated gold is also, in my opinion, a most excellent soft gold. It is perfectly non-adhesive, and for a number of years I have used it for packing against frail margins, and other points where I desired perfectly non-adhesive foil, and find it works admirably and with perfect certainty. The ammonia is perfectly driven off by a moderate heat, and the gold thus becomes perfectly cohesive. By this method of manipulation, we have our gold non-adhesive or adhesive at will. I have observed very closely to discover any objection to this use of ammoniated gold, but have found none in six years' use of it. Besides this, all non-adhesive gold is made non-adhesive by chemical manipulation, and I prefer to know what I am using, though I do not pretend to say that other non-adhesive foils may not be in every respect as good as the ammoniated. I had intended to say something of the liabilities of failure in making perfectly tight margins with cohesive gold, but my paper is too long already. I will therefore close, regretting very much that I am not, at this time, able to be with you.

PROSTHETIC DENTISTRY.

BY C. J. ESSIG.

THE following letter and reply may possibly serve a good purpose to others circumstanced as my correspondent, and they are submitted, in the hope that such may be the case, to the consideration of those seeking to qualify themselves for higher success in the prosthetics of dentistry:

"MY DEAR SIR:—Your letter of the 24th ult. was duly received, and I am much indebted to you for the prompt manner in which you answered my several questions concerning text-books.

"As you have very kindly expressed a willingness to afford me further information and advice about the proper course which I should pursue in the study of dentistry, I desire to submit to you a few points for consideration.

"In the first place, as I intimated previously, I may go fully into the study of dentistry. I am rather inclined to favor the prosthetic branch, but Dr. B——, who has thus far been my preceptor, has never given much attention to that department, and has but a slight theoretical knowledge of it. I also learn from him that most of the best dentists in the cities devote themselves exclusively to the operative department, and some even disclaim any practical knowledge of it. Nevertheless, since I have been reading up the different methods, I can see that the acquaintance of people of this section of country has been limited to the vulcanized rubber work administered by itinerant gentlemen who put in a periodical appearance.

"I may also mention that I am assured by Dr. W——, an old physician of this place, that among his patients alone much comfort might be conferred by a skillful mechanical dentist. He does not understand my preceptor's seeming antipathy to that part of his profession, and is himself so highly impressed with its importance that he thinks a good artificial denture deserves a place as a therapeutic agent.' What I particularly desire your advice upon is as follows:

"First. What would be the best course for me to pursue to obtain a thorough, practical knowledge of prosthetic dentistry? I have the text-books you mentioned, but, as you suggest, I find so many methods (some of which, for all I know, may be obsolete), that I am unable to discriminate.

"Secondly. Which of the many materials now used do you consider best to form the base or plate of an artificial denture?

"And, lastly, I wish some information concerning the cast which I send to you. It has been tried by others and has been a puzzle to us. If you can do so, I would be glad to have a description, step by step, from the beginning, of the proper plan to make a denture for such a mouth, that would be serviceable.

"Very truly, etc.,
"J. B. E."

"PHILADELPHIA, December 5th, 1874.

"Mr. J. B. E.

"DEAR SIR,—Yours of the 24th is at hand, and I shall briefly endeavor to answer your queries, in the order in which you propound them.

"First, then, permit me to say that the statement of your preceptor, about the 'best dentists of the cities' disclaiming any connection with prosthetic dentistry, should, I think, be slightly modified. I certainly do not know in this city a single dentist who does not, to a greater or less extent, practice the artificial branch. I admit that there are men among us who do, whenever the opportunity presents, profess (not to their patients, however) ignorance of this branch. Yet these very gentlemen do practice prosthetic dentistry, and you will doubtless be led to wonder how a man can successfully practice that of which he is ignorant. We will not discuss this question, nor as to whether the patients of such dentists are well served. Of one fact I feel assured, and that is, the evident retrogression of prosthetic dentistry is in a large measure due to such expressions on the part of men who occupy the position of teachers. But the mischief, I am led to believe, is but temporary.

"Now, with regard to your first question, I most unhesitatingly advise you to place yourself under the tuition of a dentist equally skilled in both branches of his profession. I cannot understand how a dentist can succeed in a country so sparsely settled as your own without a pretty thorough practical acquaintance with prosthetic dentistry. For, however much the country dentist may desire to devote himself to the preservation of the natural organs, there are obvious reasons why his duties will consist largely of the substitution of artificial ones. It not unfrequently happens, where the lower masticating teeth have been lost, and the upper ones are still *in situ* and sound, that well-adapted artificial antagonists will not only restore the function of these remaining teeth, but will arrest their elongation and speedy loss. Dentistry is capable of no greater result than this, and the artificial denture becomes a therapeutic agent, which the 'best of our city dentists' are glad to avail themselves of.

"After you have received sufficient practical training under a good instructor, you can then perfect yourself in the collateral branches.

"To your second question, I can only say, that I know of no better material for a dental plate than gold.

"I have before me the plaster cast which you inclosed. It is a lower case; the incisors, canines, and first bicuspids remain. It is a difficult case. I find embodied in it every unfavorable condition. I have, however, recently gone over similar grounds in my own practice. The plan I pursued and which proved fully successful I apply to the case you send.

"There are four points in this case which render it a difficult one. The first in order is a condition which we technically call under-cut, and is frequently met with in upper cases at the anterior or front portion of the ridge. Correct zinc casts of such a model, however, are easily obtained by using the Hawes flask. But where it occurs as in the case under consideration, we have no such resource. By referring to the diagram No. 1, representing a longitudinal section of such a model, you will see that to obtain a perfect impression of it in the sand is impossible, as the under-cut portion will at every trial carry with it a very important part of that impression. The plan I used successfully in a similar case was, to make, preparatory to moulding, a core or inside piece, composed of four parts fine marble-dust with one part of plaster. This mixture, after the cast has been slightly oiled, is poured on, and all that part embracing the under-cut or dovetailed condition, which would be likely to retain the sand in moulding, is covered. It should be allowed to set perfectly, when, by a few light taps upon the posterior part of the cast, the core will be readily loosened, and should then be exposed to gentle heat in order to thoroughly dry, when it can be again placed upon the cast, which is then ready for moulding. After the usual impacting in the sand, it is withdrawn, bringing with it the core. This core is again readily disengaged and placed back in the sand, where it will be found to have left its impression. The continuity of the sand matrix is now perfect, and you have only to pour your melted zinc to obtain a correct fac-simile of your model. The next point is, how shall we attach clasps to such a case? The ridge as it runs back falls a little downwards. Reference to Fig. 2 will show you what I mean. We cannot expect the plate to remain in its place with any degree of firmness, against gravity, too, without clasps; and to arrange clasps in the usual way, you will see by the longitudinal section, Fig. 1, is impossible, owing to the leaning position of the two first bicuspids.

Fig. 1.

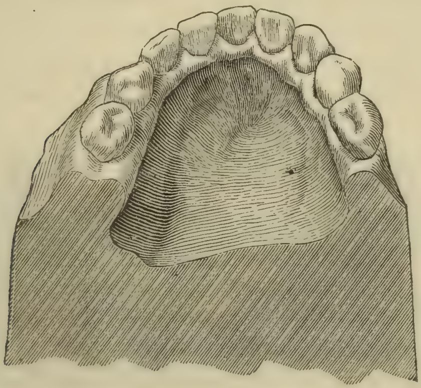
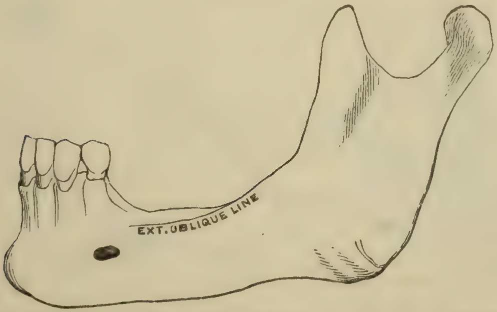
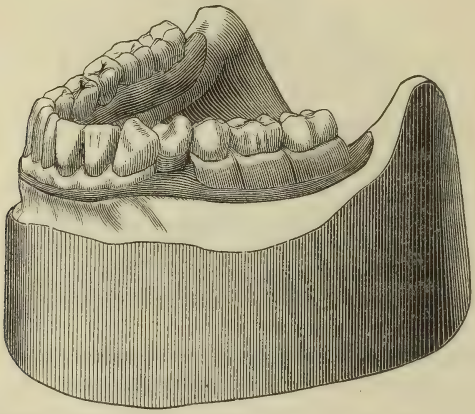


Fig. 2.



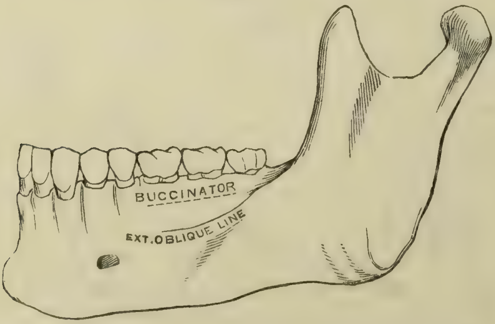
"Well, the plan which I have lately found successful in a similar case was to continue a narrow portion of the plate entirely around the front of the arch. This piece I made of two thicknesses of gold carefully swaged to fit accurately, and against the buccal surfaces of the bicuspids a piece of gold, semi-lunar in shape, was attached to the adjunct piece, as shown by Fig. 3, thus preventing any undue pressure upon the gum in front, and at the same time holding the case firmly in its place during mastication.

FIG. 3.



"A very important point in the construction of an artificial denture of this character, is to avoid any interference on the part of the plate with the free play of those muscles which we frequently find impinging upon the crest of the ridge. By referring to Fig. 4 you will see that the fibers of the buccinator muscles are attached upon the alveolar process, and directly under the three molar teeth. Reference to Fig. 2 will then show you that, after the loss of the teeth and the absorption of the alveolar process, the fibers of these muscles rest upon the external oblique line and anterior half of the dental ridge. Now, during mastication, and also in talking, these muscles are in constant action; any undue press-

FIG. 4.



ure or interference will cause an abrasion, and what follows is known to most dentists. So you have simply to take the precaution of adding wax, preparatory to making the zinc dies, upon the anterior or buccal surface of the dental ridge, graduating it in thickness from within a line of the crest down to the external oblique line, which will be found to be the outer border of the ridge, and where the mass of muscular fibers is thickest. This will prevent any pressure and permit free play to the integuments, as well as avoid suffering to your patient and much trouble to yourself.

"By following the general plan which I have laid down for this case, I trust and believe that you will succeed in restoring to your patient the function of mastication, at present greatly impaired, necessarily. Give him the use of his superior molars, and thus save them to him for many years to come, and relieve the incisors of the overwork which is evidently endangering their vitality, and you will have achieved one of the greatest results of which dental science is capable.

"Respectfully, etc.,
"CHAS. J. ESSIG."

A PRACTICAL DEVICE FOR AN UNDER-CUT CASE.

BY E. WILDMAN, M.D.

HAVING recently had my first failure in a celluloid case on account of the plaster model breaking down in bringing the sections of the flask together, I will relate how this occurred, and the method used to overcome this difficulty, hoping it may be of some benefit to my professional brethren who may have a similar case.

The cut No. 1 represents the under section of the flask containing the model of the part of the gums upon which the denture rests, and placed in the usual position. The alveolar ridge is projecting in three-fourths of its extent, and particularly so and quite thin on the anterior portion, extending back as far as the space formerly occupied by the canine teeth. This portion of the alveolar ridge, when a perpendicular force is brought to bear upon it (such as is exerted in bringing the sec-

FIG. 1.

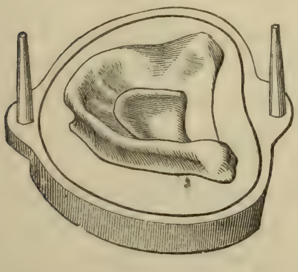
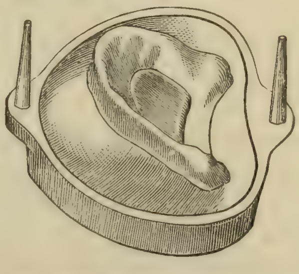


FIG. 2.



tions together), has no base of support, and has to depend for its integrity of shape upon the strength of a thin section of plaster.

In this case, although great care was exercised in bringing the sections of the flask together, the anterior projecting edge of the alveolar ridge chipped off and produced an annoying failure.

The next move was to make an exact counterpart of the model of the gums in type-metal by the aid of Hawes's flask. To test the propriety of using this metal model upon which to mould the celluloid base, to it was accurately fitted, while in a plastic condition, a thick plate of prepared gutta-percha (such as is used for base-plates for model sets); this, when hard, was so firmly retained by the under-cut as to show the impracticability of using it for the purpose designed.

The model was then carefully examined to ascertain what means could be devised to obviate the cause of failure, which I admit should have been done in the first instance. A little reflection upon the effect of the required force upon the model gave the idea.

I then fell back upon the plaster model, which was placed in the lower section of the flask in position as represented in cut No. 2, so that the perpendicular line of force (or pressure) in bringing the sections of the flask together would pass almost wholly through the mass of plaster supporting the projection.

The result was, the case was moulded without any injury to the plaster model, and was a perfect success.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST JUDICIAL DISTRICT DENTAL SOCIETY.

REPORTED BY F. M. ODELL, D.D.S.

At the regular meeting held the 5th of January, the subject for the evening being "Alveolar Abscess," a paper was to have been presented by Dr. Atkinson, but owing to too short notice it was not forthcoming. He, however, made some extemporaneous remarks, enforcing the doctrine that abscess is the "arrest of the flow of pabulum."

Dr. J. S Latimer requested the opinion of Dr. Gibson (a physician present) relative to the possibility of the pulps of four incisors, in a case which he had been called to treat, having died in consequence of ptyalism; the canal of one having never been opened, and no cavity being in the tooth. The canal on being opened was found to be perfectly dry and sweet.

Dr. Gibson responded, promising to write a paper to be read at our next meeting.

Dr. Kingsley cited a case in which the fact of some of his kind dental brethren having been induced to give their opinion concerning the value of his services in a case of regulating, had obliged him to accept two-fifths of the amount of his fee in settlement, without benefiting themselves in the least, unless the knowledge of having caused him loss might be so considered.

About ten teeth were moved in the case cited, being brought into line in the space of two months less one day.

The thanks of the society were unanimously voted to Drs. Goble and Webb, who had come to the city to give clinics before the society this afternoon.

Dr. R. M. Reynolds mentioned the case of two central incisors, which he is now treating in consequence of the pulps having been destroyed, undoubtedly in consequence of the application of arsenic to obtund sensitive dentine; the cavities having been filled less than two years ago, and being very small; no exposure of pulp.

Dr. Goble thinks it well to always remove the cause of abscess thoroughly, if it can be ascertained, and wait for nature to effect the cure.

Dr. Clark, speaking in relation to treatment of sensitive dentine with arsenic, related a case wherein he had applied it for, and at the request of, Dr. George Parmly, just prior to his leaving town, and said that in a few months he received a letter from him containing this advice, "Never use arsenic!"

CORRECTION.

Dr. L. G. Noel desires a correction of language attributed to him in the report of the proceedings of the American Dental Association, in the Dental Cosmos for December, page 656. In the sentence, "saliva has, as is well known, the power of converting phosphate of lime into grape sugar," the word starch should be substituted for phosphate of lime.

EDITORIAL.

A FUNDAMENTAL REQUISITE.

While it must be admitted that a knowledge of anatomy, physiology, pathology, and therapeutics is required in the conservation of the dental organs, and while, also, as must be equally apparent, artistic culture is every way desirable in the prosthetics of dentistry, it is nevertheless evident that the first absolute and indispensable requisite of a dental practitioner is a perception of the mechanics of the calling and manipulative dexterity.

There is danger that in the laudable ambition to justify the doctorate by medical culture the necessity of handicraft may be to a great extent neglected. It seems indeed difficult to prevent the adoption of extreme views in one direction or another on this subject. "The profession has been too much engrossed with the mere mechanics of the calling," says one. "The exaggeration of the necessity for a medical education threatens to fill our ranks with incompetents, so far as manual skill is concerned," says another. "He can remove a tumor or make a resection, but he cannot plug a tooth." "He can make a handsome filling, but that is all he knows." "He can diagnose skillfully, but he cannot correct the trouble unless it is to be met by a prescription." "He is a first-class jeweler, but has no more perception of facial requirement than any other jeweler." These and like criticisms show not only the one-sidedness of the practitioner, but generally, and as surely, an equal failure on the part of the critic to comprehend the circle of the requirements. Hypertrophy of the gums from stomatitis, referred by a medical man to a dentist, because it was not in *his* line; swelling of the face from a dead pulp and consequent alveolar abscess, referred by a dentist to the family physician, as erysipelas, because that was out of *his* line. Cases such as these show how desirable it is that a dentist should be more than a mechanic. On the other hand, fillings which can be removed with a toothpick, or dentures whose artificiality (to say nothing of their inefficiency) shocks every beholder, demonstrate that he should be something besides a doctor.

Half-knowledge in any vocation is deplorable, and yet, how few in the profession of dentistry have secured the reputation of masters!

"Can you commend me to a thoroughly reliable dentist in ——?" was asked of a practitioner in the presence of the writer a short time since.

"My answer will depend upon the character of the service required," was the reply. "If you desire an artificial plate in the highest style of the art, I would name one gentleman; if you desire first-class fillings, another; but if medical advice or surgical interference in regard to abnormal conditions is sought, still another." Alas, how few there are who "fill the bill"! Yet, after all, however discreditable it may be to lack knowledge rightfully assumed as belonging to the calling, there is no lack so deplorable as that of the manual dexterity to perform the operations which are and must continue to be the staple of dental practice. If, where all are important, we must choose what particular qualification may be ignored, manipulative skill must be the last to be slighted. In the discussion of dental educational problems, it should be remembered that no medical, surgical, or æsthetical culture will compensate for the want of manual skill. Any preparation which fails to develop a high order of mechanical dexterity fails in that which is the first requisite of the dentist, as indeed it is that of the surgeon at large.

What if one can stand a creditable examination upon the pathology, diagnosis, prognosis, and treatment of all oral lesions; or can perform any surgical operation required thereby, if he cannot, when desirable, make an elegant and permanent filling? Wherever educated or graduated, such a dentist, no matter what his other qualifications, is not worthy of the name.

To natural and acquired manipulative ability, as the first requisite, should therefore be *added* the broader culture which has been indicated. The substitution of it will not meet the requirements. Every young man proposing the study of dentistry, with a view to its practice, should be instructed that, while the theory is based on principles which belong alike to every specialty of medicine, its practice necessarily involves an apprehension, to no mean extent, of mechanical laws, and includes the manual culture required to actualize the dictates of the will.

BIBLIOGRAPHICAL.

DENTAL PATHOLOGY AND SURGERY. By S. JAMES A. SALTER, M.B., F.R.S., Member of the Royal College of Surgeons, and Examiner in Dental Surgery at the College; Dental Surgeon to Guy's Hospital. New York: William Wood & Co., 1875.

This volume is a collection of previous essays and papers arranged in the form of chapters, with the addition of several new chapters.

It is a work on dental surgery rather than on dentistry proper, although, as the author acknowledges, some subjects are not considered which fairly belong to dental surgery. The omission is explained by his desire not to supply by compilation, but as the result of independent thought and observation.

The author in his preface recognizes the hiatus between general surgery and dentistry, to which attention has been frequently called in these pages. Having practiced general surgery, he became aware when determining to devote himself to the practice of dental surgery, as a specialty, of the narrow and circumscribed view comprehended by the literature of that specialty, and recognized that there was what he calls "a debatable ground" between that occupied by the surgeon and by the dentist, which was open to further research, and which promised ample reward to the laborer in its investigation; that even eminent surgeons had failed to recognize the gravity of some of the maladies dependent on diseases connected with the teeth and morbid changes in contiguous structures associated with their pathology; and, on the other hand, that the pathology of the teeth themselves had been imperfectly investigated by dentists.

The volume is divided into twenty-eight chapters, not including, as we had expected, one upon development—a serious omission; but taking into consideration the general anatomy of the teeth, their functions, abnormalities in number and relations, including congenital defects of structure and form, caries, necrosis, secondary dentine, diseases of the pulp, mechanical injuries, odontomes, tumors, dentigerous cysts, hypertrophies, alveolar and antral abscesses, extraction and hemorrhage after extraction, cleft and perforate palates, characteristics of the saliva, and affections of the nervous system dependent upon diseases of the teeth.

The first chapter, on the general anatomy of the teeth, is concise and clear, but does not call for special observation. The second, on the functions of the teeth, is exceedingly interesting, as illustrating the relation of the tongue to the teeth and the palate in the production of various sounds. Chapters three, four, and five, on supernumerary teeth, deficiencies in teeth, united teeth, and irregularities in position of the teeth, are very interesting and instructive histories of such abnormalities, though we should have been glad if the author had made a more earnest attempt to classify and explain the causes underlying them. Recent investigations point to a correlation between the development of the mouth and teeth to systemic and mental development, which deserves close observation, comparison, and record. The relation between a low congenital mental development and the character of the dentition; the association of constitutional nervous irritability, epilepsy, etc., with peculiar characteristics of the dental organs,—these and kindred topics are waiting to be more thoroughly explored.

In the chapter on secondary dentine, the author discusses the inaccuracy of the accepted nomenclature, and subdivides it, according to the anatomical distinctions which the different forms exhibit, into *Dentine of Repair*, *Dentine Excrescence*, and *Osteo-dentine*. This is one of the most interesting portions of the volume. The chapters on congenital defects of structure and form, on caries, on mechanical injuries, and on necrosis, are good so far as they go, but are not so complete as they might have been made. The essay on odontomes is the best upon the subject of which we have knowledge. In the chapter on diseases of the tooth-pulp, we were specially interested in the sections treating of polypus of the pulp. The author's experience has been that this pathological condition is generally associated with soft complexion, fine hair, small teeth, and general tegumentary feebleness. The subject of tumors of the gums is discussed in a long and well-written essay.

The chapter which treats of the impaction of permanent teeth in the substance of the maxillary bones, and occasional results therefrom, is finely illustrated, and is alone worth the price of the volume.

Passing over the essays on dentigerous cysts, difficult eruption of the wisdom-teeth, alveolar abscess, and abscess of the antrum, all of which subjects are concisely and intelligently treated, we read with special interest the pages devoted to affections of the nervous system dependent upon diseases of the teeth. If this chapter does not illustrate the debatable ground spoken of by the author in his preface, and demonstrate the necessity for a broader culture of the dental specialist, as well as a better appreciation on the part of the general surgeon and physician of the maladies dependent upon tooth disease, we should despair of any effort to enlighten the skeptic of either class.

If space permitted, we should be glad to invite attention to other parts of the work, especially to those treating of constitutional relations, as of the sequelæ of the eruptive fevers, syphilis, etc.

The book is not beyond criticism in more directions than one, but as the latest, and, in many respects, the most original contribution to the higher literature of dental specialism, we commend it most heartily to the profession, and shall be glad to hear of its extensive sale on this side of the waters.

The illustrations, we may add, one hundred and thirty-three in number, are well executed, and most of them, we judge, engraved to illustrate the author's descriptions. The volume is in every mechanical respect excellently well produced.

OBITUARY.

HENRY E. BALIS, D.D.S.

Died, at Hudson, N. Y., after a protracted illness, Henry E. Balis, D.D.S., aged twenty-six years.

Dr. Balis graduated from the Philadelphia Dental College, with the class of 1870–1. By his gentlemanly bearing he won the respect of his classmates, many of whom treasured bright hopes for his future.

Dr. B. was an earnest student, a kind and skillful operator, and a Christian gentleman.

Though his professional career was short, yet he won many golden opinions from his brother dentists.

PERISCOPE.

Cases of Chronic Mercurial Poisoning from the use of Pink and Red Vulcanite in Artificial Gums, with Remarks and Experiments.—As the red sulphide of mercury is one of the oldest preparations of that metal, as it is extensively used in the arts, and has been employed in medicine from a very remote antiquity, it is not surprising that its poisonous properties have long been familiar to medical men. My own attention was drawn to the subject by the actual occurrence of cases in patients coming under my care some ten or twelve years ago. I could find no other explanation of their symptoms, except that they were wearing artificial gums, or artificial palates colored with vermilion. I had never then heard that the same facts have been noticed by others, and the experiments then undertaken, and since repeated, were made in complete ignorance of the labors of others on the same subject. In the last edition of Dr. Taylor's great work on "Medical Jurisprudence," vol. i. p. 290, he states, under the heading of "Cinnabar Vermilion—Persulphide of Mercury," that Dr. Sutro published a case in the *Medical Times*, September 27th, 1845, p. 17, of poisoning by the *vapor of vermilion* applied externally.

"A woman, by the advice of a quack, applied the vapor to a cancerous breast. She employed three drachms of vermilion, and covered herself with a sheet, so that the vapor should only reach the body externally. After three fumigations she suffered from severe salivation and violent fever, which continued for four weeks. The right arm became œdematous." A few lines above, he says, "It (cinnabar) is also improperly applied by some dentists as a coloring matter to vulcanized rubber for mounting artificial teeth. Although this insoluble compound of mercury cannot be regarded as an active irritant poison in the stomach, the placing of it in such a situation that it should always be in contact with the mucous fluids of the mouth is liable to lead to the usual consequences of chronic poisoning by mercury.

"In May, 1864, a medical man consulted me under the following circumstances: Upon the recommendation of a dentist, he had worn this red composition as a frame for false teeth in place of gold. After some time he perceived a metallic taste in his mouth, the gums became inflamed and ulcerated, there was great weakness and want of nervous power, with pains in the loins, and an eruption on the legs. *When the composition was removed, these symptoms abated.* [The italics are mine.—W. B. W.] I examined the substance, and found in it a great quantity of vermilion; it had been mixed with the sulphur and rubber to give the appearance of the red color of the gums.

"Dr. Wells, of Reading, has directed the attention of professional men to accidents of this nature. A patient of his who had been provided with a frame of this description for the upper and lower jaws, perceived, soon after wearing it, a metallic taste in his mouth; his health failed, he lost his appetite, and became emaciated; he suffered from flatulency, fetid breath, and looseness of the bowels; his pulse was 100, and weak, and his tongue coated with a white film. This gentleman was peculiarly sensitive to the action of mercury. He left off wearing the teeth, and became gradually better and stronger." (*British Medical Journal*, September 5th, 1863, p. 366.)

Dr. Taylor goes on to state that vermilion, or the organic compounds containing it, may be entirely decomposed by nitro-hydrochloric acid. The residue, evaporated to dryness, contains corrosive sublimate. This may be treated with water, ether, etc., and the usual tests applied.

It might almost be inferred from Dr. Taylor's statements that only dentists of an inferior class use or recommend these natural-tinted rubbers, or vulcanite, and that the basis, thus tinted, was always the same. I found, however, on inquiring carefully, that very large quantities of this material were manufactured, and that in past years, at least, dentists of the highest respectability, and in various parts of this kingdom, as well as on the Continent, had supplied their patients with this *matériel vraisemblant.* It is not always vulcanite. I had specimens of various depths of tint, from varying proportions of vermilion; and of varying hardness, some of the cheaper kinds being simply blanched gutta-percha incorporated with cinnabar. I have to thank Dr. Martin G. Payne, F.C.S., for several specimens obtained by him for me; others were given me by friends, and some I bought. The result of my examination and experiments is as follows:

1st. All the pink and red artificial gums, palates, and materials for the same which have been examined by me contained vermilion. It is well to state this, as several dentists have questioned the fact, and others seemed surprised. Some of my medical and chemical friends have suggested that preparations of lead, chromium, and other pigments would probably be found in some. I can only say no such specimens have yet reached me.

2d. The quantity of vermilion present was not always proportionate to the depth of tint. Some of the most beautiful and natural specimens contained the pigment rather in a state of very fine division than in any great quantity.

3d. Does the warmth of the mouth, and the action of the saliva, or of articles of food, actually produce volatilization or solution of the pigment? As the temperature of the mouth seldom exceeds 37° or 38° centigrade, and saliva is a very dilute solution of the saline substances it contains, the possibility of both these methods of possible injury has been questioned. I believe, however, that poisoning occurs in both ways, and possibly by a third method; viz., by conveyance to the stomach, along with the food ingested, of minute particles worn off in the process of mastication. As regards the first method, or volatilization, I have satisfied myself by delicate methods of analysis that nearly all the mercurial compounds are somewhat volatile at lower temperatures than 98° or 100° Fahr.

It may be remarked parenthetically that lead, arsenic, and numerous other bodies, in forms not usually deemed volatile, are so in a slight degree, as proved by continuous observation at ordinary temperatures, a fact well known to chemists. But the prepared rubber, or tinted vulcanite, *slowly gives up its mercury* (which is only mechanically mixed with it) both to saliva and to an artificial solution made to imitate it with common salt, sulpho-cyanide of potassium, etc., at 60° Fahr., and more quickly if the solution be kept at 100° Fahr., and the metal can be easily detected by electrolysis, as well as by other tests. This solution may be hastened by agitation. Solutions of several of the haloid salts have similar solvent properties. If any one repeats my experiments, he must be content to keep the saliva or other fluid in contact with the rubber for several days. To test for the cinnabar, if our object be to rapidly prove the presence of the metallic pigment, the rubber or vulcanite should be finely sliced, put into nitro-muriatic acid with a little distilled water, and exposed to the heat of a sand or water bath.

4th. It will probably be objected, that although this solution goes on slowly, yet the constant washing of the artificial gum or palate would really prevent the occurrence of mischief in the human body. As this is simply a theoretical objection, it seems best answered by narrating three or four out of about a dozen cases observed by me from the year 1862 up to last year, 1873. As in the cases quoted by Dr. Taylor, it will be seen that, once rid of the corpus delicti, the red gum, not of Australia nor of the nursery, but of the dentists, the patients rapidly recovered. "*Tollitur effectus, sublatâ causâ.*"

5th. It is to be noted that the saliva and urine in some of these cases contained minute but unmistakable traces of mercury, every possible precaution being taken to avoid known and probable sources of fallacy.

CASE I.—*Ptyalism, Rupoid Eruptions, Cancroid Sores of the Mouth, and Mercurial Erythism in a Patient of the Torbay Infirmary.*—In the year 1862, a poor woman, living in Torre, aged fifty, consulted me on the state of her mouth. She was profusely salivated; the few teeth she had left were all loosened; there were sores of a deep, ragged, and spongy character in the cheek and gums, like cancrum oris; her breath was extremely fetid, and she had rupoid sores on the body, a general condition of fever, muscular weakness, and general irritability. There was also diarrhœa of a dysenteric kind. In her case there had been previous symptoms of constitutional syphilis, and as she had been under quasi-medical treatment, I suspected that she had been purposely salivated. Indeed, I did not know that she was then wearing a plate of red vulcanite, because she always took it out before coming to see me, and, indeed, could not wear it when she first came. It was only when similar symptoms recurred some twice or so at intervals of six weeks or two months after recovery, that I began to suspect some chronic and perennial source of mercurial poisoning, and at last discovered the fact of her wearing a vulcanite gum, supporting seven or eight teeth, which had been given her by some charitable ladies on account of her speech being so defective. This gum, when examined, proved to contain a very large admixture of red sulphite of mercury. This case had, however, almost escaped my memory when case No. 2 occurred.

CASE II.—*Mercurial Eczema and Erythism in a previously Healthy Woman.*—Mrs. F—— came to the London Hospital in 1864, and was seen by me during the holiday of one of the assistant-physicians. Unfortunately, I have omitted in my notes to state whose case this really was. She presented a most typical, but pitiable picture, of almost general eczema, of the kind generally known as rubrum. Where there was as yet no discharge, there was intense redness of the skin, and minute papules. Her age was about forty; the catamenia regular. Her general health had been good; in fact, till about three months before, she "had never known a day's illness." Now her condition was sad in the extreme; there were muscular tremors, swollen and ulcerated gums, the breath extremely fetid, and profuse salivation. She was feverish, excitable, and owing to want of sleep, the irritation of the skin, and perhaps some special toxic effect, her mental condition closely bordered upon insanity. Those who have watched cases of poisoning by the methyl compounds of mercury will know why I make this special reservation as to peculiar toxic effects upon the cerebrum. She was wearing a plate of red gum with some five or six teeth in the front of the mouth, to replace the incisors, etc., of the upper set, which she had lost from accident many years before. Asked how long it was since she had been quite well, she replied, "Not since I had my new teeth." This was simply a chronological method, as she had not the least idea of the "plate" being the cause of her symptoms. This "gum" was longer than usual; in fact, it fitted nearly the whole of the roof of the mouth, presenting some four or five square inches of surface, at the least. This time, however, it attracted no suspicion. Its use was left off for a time, simply because the mouth was so bad. Admitted to the hospital, she soon got well, with baths, gargles, chlorate of potash, and soothing local treatment. About six weeks after, she relapsed into a condition nearly as bad as her former one. This time the resemblance of her symptoms to mercurial poisoning attracted more attention, as the most careful inquiry failed to show any other possible source of poisoning than the "teeth plate" in question. She had taken no medicine—used no doubtful cosmetics—been exposed to no danger from any manufacture. In short, no reasonable doubt could be entertained as to the cause being some mercurial, for mercury was detected in her saliva, and also in the urine passed by her. The plate was then examined, and found to contain vermilion in large quantity.

It may appear strange that after these two cases, both of which were cured, I believe permanently, by leaving off the use of their new teeth, my attention should not have been more directed to this source of danger. The explanation is simple. Hundreds of people were wearing these plates, and the peculiar symptoms were noted only in one or two. Mercury enters so largely also into popular pharmacy that one often suspected "*vegetable*" or "antibilious" pills, rather than a cause much nearer home. In the year 1867, two or three similar cases came under my notice in Hampshire, and I could not fail to be struck with the fact that all were wearing these red or pink gums, and that in all the cases there was a sort of chronological sequence between the acquisition of the new teeth and the occurrence of the symptoms. In 1868 and 1869, one or two other cases occurred, but I cannot say that any one of them, taken singly, would have carried conviction to my mind. I know of no special character of "mercurial" fetor, and eminent surgeons whom I have consulted agree with me, that, except from other symptoms, from the history of the case, or from discovering mercury in the saliva, urine, or other secretions, there is no pathognomonic character in either mercurial salivation or its fetor. Yet my attention was now aroused. I began to collect "red gum material" to make experiments, and to look out for cases. It was not long before one occurred among my own acquaintance.

CASE III.—*Salivation, Diarrhœa, etc., in an Aged Lady.*—I was consulted for some apparently anomalous symptoms occurring in an old lady previously of wonderful health and vigor, although closely approaching her eightieth year. The house in which she lived was well built, on high ground, in a healthy situation, and careful inquiry failed to discover anything in her mode of life, or her surroundings, or her past history, to throw light upon her symptoms. She had become irritable, feverish, wakeful at night, tremulous, weak, and utterly prostrate, without any obvious cause. Yet her intellectual faculties were clear enough. There was no kidney-disease—no evidences of arterial lesions—no known cause for the mental perturbation or bodily malaise. At the same time, she began to be salivated, to have a coppery taste in the mouth, her palate and gums got sore, there was troublesome diarrhœa, and other unpleasant symptoms. On examination, I found she was wearing a large plate of pink vulcanite with teeth imbedded in it, these teeth being of a very good artificial compound, chiefly consisting of silica. The symptoms were at once relieved, and lastly cured, by leaving off this plate and getting a gold one instead. She now enjoys excellent health, considering the advanced age she has reached.

Some still more striking cases presented themselves in the years 1870–1–2, two of which, at the risk of being thought tedious, I will relate.

Case IV.—*Hydrargyrism in a Young and previously Healthy Woman.*—M. P——, aged eighteen, was brought to me suffering from ulcerated mouth, salivation, tremor of the limbs, hysterical symptoms, and a sort of lichen-eczema, not so unlike grocers' itch except for its brighter color and more intense character. She had been a fine healthy girl, quite regular, quite free from nervousness or hysteria, and came of a healthy stock. When quite a child, a drunken man had knocked out some of her front teeth, and for this she had lately been persuaded to wear some artificial ones in a frame of red vulcanite. I examined her mouth, got her to save a considerable quantity of saliva (some three to four pints nearly were rapidly and easily collected), and I tested this and her urine, and in both found sufficient mercury to "silver" a sovereign. She was ordered to *leave off the plate*, to keep the mouth clean with a weak solution of Condy's fluid; a little zinc ointment was used for the eruption, and no medicine given. She also rapidly got well.

The next case was in a man of about thirty-six, and is, if anything, still more convincing.

Case V.—*Symptoms of Poisoning by Mercury cured more than once by leaving off the Vulcanite Gum, and recurring again when the Teeth were resumed.*—A literary man was brought to me by one of my medical friends, who had heard me speak of the use of these plates. The patient had some years before suffered from symptoms of syphilis, and my friend thought it possible that our patient had been quacking himself. The symptoms were chiefly confined to the mouth, except the nervous phenomena, which closely approached those of hysteria. He was married, and we could not discover any sexual or alcoholic excesses. His mental labor was not excessive, and he had a private income, which kept him from any special anxiety as to money matters. He had been wearing a red vulcanite plate in the lower jaw for about seven months. The symptoms commenced five or six weeks after this had been fitted. He admitted that he often slept with the plate in his mouth. We agreed not to tell him our suspicions, but to treat the local symptoms, advising him not to wear the teeth till the mouth grew harder; indeed, at this time he could not bear it in the mouth. *Mercury was found in the urine.* We did not examine his saliva at the time, for obvious reasons. He soon got well, was allowed to resume his teeth, and in six weeks was again ill in the same way, though not so badly. Treated as before. On once more resuming the plate (six months after first attack), he was again salivated, had ulcers in the mouth, etc. This time the saliva was found to contain mercury, when a sufficient quantity had been collected. Once more the red gum was left off, and once more he got well. The nature of the case was then explained to him; but he was so incredulous as to our statement, and so full of confidence in his dentist, who was a personal friend of his, that he began again to wear the plate. Three weeks after he told me triumphantly that he was all right; but ere another three weeks slight symptoms had set in, which gradually became more severe; he was attacked with a species of writer's cramp in his right hand, and then he was persuaded to finally abandon the treacherous teeth,—or rather, their setting. He has had a gilt metal frame, and has ever since been perfectly well.

Résumé.—I think few candid persons will doubt that in some cases, perhaps more numerous than we now think, severe effects follow the continued use of artificial gums, palates, and teeth-plates colored with mercurial pigment. The amalgams used by some dentists may produce similar symptoms. The question is one which I think well deserves the attention of scientific dentists and chemists. I write on it as a practical physician; and as my cases extend over nearly twelve years, I do not think I have displayed undue haste in doing so. There is some danger now of arsenical, lead, and chromium pigments being substituted, and toxic symptoms, due to these metals, rather than to mercury, may possibly have been noticed in some cases. A dental student told me that herpes labialis is unusually common in those who wear false teeth; but this may possibly be due to mechanical irritation only. Well-fitting teeth are otherwise so desirable, that it would be well to devise and employ some pigment of a natural color which should be free from the objections attaching to all the metals I have named.—*W. Bathurst Woodman, M.D., in Medical Press and Circular.*

AN ANOMALOUS CASE.—The following anomalous, if not unique, case would seem to go far in favor of the view of Solly and Dalrymple, that mollities ossium is an expression of the cancer-vice.

Some four years back, Major S., of Tennessee, a gentleman of robust constitution and in apparently the most vigorous health, was sent to me by his physician for consultation and advice, the case presenting at the time these features: The teeth of the left side, superior jaw, from the central incisor to the last molar, were found loose in mass, not individually, but as if all that portion of the bone containing the alveoli had separated from the adjacent hard parts, forming with the dental organs a common sequestrum. Preceding this condition there had been no exhibition of inflammatory phenomena, nor, at the time of interview, was there the slightest expression of vascular perversion.

Using the exploring-needle in the examination, I found no evidence of bone, either in the loosened portion or in the parts immediately adjacent. The operation consisted of an external and internal flap, thus liberating the exfoliation, which, when removed, was found to consist of a remarkably healthy-looking alveolar mass, made up apparently of cartilaginous tissue.

Close study of the case, made at the time, verified the absence of any of the ordinary constitutional diseases, such as syphilis, tuberculosis, scrofulosis, etc., to which osteomalacia is frequently attributed; neither was there evidence or knowledge of local injury or of defect on the part of the nervous relations.

In the healing of the wound made at the time, it was noticed that simple and immediate reunion occurred with the raw surfaces of the flaps, and that these adhered to the enveloped parts by a mechanical rather than a physiological attachment. The patient in five days was sufficiently recovered to be out on the streets, and in three weeks returned to his home.

One year later, the patient returned to Philadelphia for further advice. Absorption of the remaining portion of maxilla, together with the malar bone, had progressed in the interim to an extent which showed marked deformity by flattening of all that side of the face. Horseback-riding in the early morning, and salt-water bathing, conjoined with the phosphate tonics, were directed.

The continued history of the case is given in the accompanying letter, just received from the attending physician. The final result I shall look for with great interest, trusting that it may be more favorable than would seem to be warranted by the description of Dr. Scruggs:

"SWEETWATER, TENN., December 10th, 1874.

"DR. GARRETSON:

"DEAR DOCTOR,—Your old patient Major W. E. S., on whom you performed an operation some time ago, requests me to write to you in reference to his condition and ask you to make such suggestions for his treatment as you might think proper. You will recollect that the upper jaw and cheek-bone on the left side were removed. Since his visit to you, the other side has absorbed almost as much, but there is a bony projection under the right eye, while there is none under the left. There seems now to be a fleshy growth or enlargement that occupies the place where the bones were, and this is causing the face to protrude and to appear much enlarged. The growth seems to infringe upon the region of the left eye so much that the organ is forced outward and upward, leaving its socket considerably. The right eye, however, being protected by the bones just under it, is not disturbed, and in consequence the enlargement is forced downwards and outwards on the right side more than on the left. There is very little pain about the face, but a feeling of tightness, which is increased when the parts are unprotected. There is some secretion from the nares, front and rear, causing occasional spitting and blowing of the nose. There is a fleshy teat appearing in the left nostril, and I think likely the entire enlargement of the face is due to a similar growth. The major's health otherwise is very good. He has lately been using iodide of potassium in comp. syr. of stillingia, also Fowler's solution. But I do not look for a reduction of the seeming fleshy enlargement from this treatment. There seems to be no fungous appearance about the growth.

"Advise me what further is to be done.

"Very truly, etc.,
"R. F. SCRUGGS, M.D.,
"*Attending Physician.*"

—*Dr. J. E. Garretson, in Phila. Med. Times.*

ANÆSTHESIA.—Dr. Jacob Helburg, of Christiania (*Berliner Klinische Wochenschrift*, No. 36, 1874), proposes a substitute for the present method of relieving difficult or impeded respiration during anæsthesia. The use of the gag to pry open the mouth, and of the forceps to drag forward the tongue, is frequently attended with some injury to the mouth, of a permanent character, or, at least, may be followed by a sense of discomfort lasting for some days. His procedure consists, simply, in dragging forward the lower jaw-bone, and is described by him as follows: "Standing behind the recumbent patient, the two thumbs of the operator are placed upon the symphysis of the lower jaw, while the index-fingers are hooked behind the ascending ramus of the jaw. The bone is then pulled forcibly forward (anatomically). The force should be applied as if the operator intended to lift the patient up by his jaw-bone. During anæsthesia, the head of the bone slips forward with a perceptible jerk, and the whole lower jaw overlaps the upper jaw. As soon as this is accomplished, which is easily done in children, a deep, full inspiration follows immediately, and continues as long as the bone is held in position. The author supposes that the epiglottis is thus lifted off the rima glotidis.—*Boston Medical and Surgical Journal.*

New Operation for Certain Cases of Cleft Palate.—Dr. William S. Forbes read a paper on "A New Operation for Certain Cases of Cleft Palate and Bifid Uvula."

The new operation is adapted to cases in which each half of the split uvula and velum is large and thick, and in which the cleft does not extend entirely through the velum up to the hard palate.

It consists in making an incision from a little below the middle of the right half of the uvula, on one side, and carrying the bistoury up to a point above the arch of the fissure, and then, turning the bistoury, to bring it down to a corresponding point in the uvula of the opposite side.

The column of flesh on either side of the fissure, now liberated by this incision, turns on its attached pedicle, or falls from the arch, leaving a long uvula with an oval opening in its base.

In the first case, a few days after the operation granulations sprang up, and the parts contracted. A day or two later, when the upper part of the wound began to widen, the tensor and levator palati muscles were divided with a double-edged knife, as recommended by Sir W. Fergusson, all tension being thus removed. The upper edges of the opening then approached the median line; and, under the application of a little nitrate of silver, cicatrization and narrowing of the entire opening rapidly ensued.

This case eventuated in a cure, as did also a second one in which a similar operative procedure was practiced.—*Report College of Physicians of Philadelphia, in Phila. Medical Times.*

The Function of the Uvula.—Looking, to-day, into the pharynx of a patient suffering from a severe nasal catarrh, I saw the watery secretions from the back of the nose pouring down in a continuous stream from the tip of the uvula on to the dorsum of the tongue. It was evident that they were collected to this point from all the surrounding parts, and that the uvula acted as a conduit to bring them to the front of the epiglottis, whence they might be safely carried down the throat by repeated acts of deglutition; whereas, had it not been for the uvula, they would be liable to drip behind the epiglottis, and thus cause constant discomfort by getting into the larynx. This very simple but important function of the uvula has not, so far as I am aware, been noticed before, notwithstanding all that has been written about this odd little organ.—*Horace Dobell, M.D., in British Medical Journal.*

Treatment of Persistent Neuralgia.—Among the many remedies that have been tried for rebellious neuralgias, M. Desnos, of the Hôpital de la Pitié, recommends the following combination as being frequently successful; and even in cases where it has failed, if tried again after the lapse of a short time, it may succeed. He first applies over the painful spot three or four mustard poultices, and then rubs into the reddened surface a liniment composed of—

Oil of hyoscyamus, ℥iss;
Laudanum, ʒss;
Chloroform, ʒiss. M.

—*Journal de Médecine; The Practitioner.*

On Persistent Hemorrhage.—I read with considerable interest an article on Hemorrhagic Diathesis, by Dr. Chase, wherein he relates his experience in a case of persistent recurring hemorrhage following extraction of a tooth. I think such cases are far more common than one would think from the meagre notice given to this accident in works on surgery.

It fell to my lot to have an experience almost identical with your correspondent (*Reporter*, Dec. 5th, 1874), wherein I used all the approved remedies and a great many expedients of my own suggestion, all followed by mortifying failure. I finally resorted to the actual cautery, using for that purpose the cautery-iron figured in Dr. Thomas's work on "Diseases of Women," used in applying actual cautery to the neck of the womb. It has a round bulb which nicely fits the orifice left by the extraction of a tooth. I think in his case (that of Dr. Chase) had it been used thoroughly, the bleeding would have been checked, as it was in mine, immediately. It is a last resort, requiring some nerve to submit to. It must check the bleeding, because it produces a heavy, thick eschar, impervious to blood, besides coagulating it in the vessels supplying the hemorrhage. Though an old remedy, we should give it a trial in all those cases where life is threatened from the cause under consideration.—*A. Jessup, M.D., in the Medical and Surgical Reporter.*

Charcoal as a Dentifrice.—A writer in the London *Lancet* asserts that the constant use of powdered charcoal as a dentifrice will produce a blue line on the gums closely simulating that of lead-poisoning.—*Philadelphia Medical Times.*

Alcohol in Dental Operations —Mr. Sewell made a communication on the use of absolute alcohol in dental operations. The first use of absolute alcohol was for drying purposes. He had tried it in his practice, and found it very useful in thoroughly drying the cavities before the insertion of fillings. Another quality which would make it still more valuable in dental operations was its antiseptic properties. It would be very valuable in such operations as extracting nerve-pulps and filling fangs. In these cases, by the use of absolute alcohol and oxychloride of zinc fillings, there had been much greater success than by the old method of dealing with fang fillings. Mr. Sewell then read a contribution on the same subject by Mr. Fletcher, who advocated the use of chloroform and the lining of cavities with varnish.

Mr. Coles testified from his own personal experience to the value of the suggestion of Mr. Sewell as to the use of absolute alcohol. It was especially useful in those cases where there was a large cavity with a mass of softened dentine exquisitely sensitive to the touch of the excavator. He recommended it to those who had not yet tried it, with very great confidence.

Mr. Tomes said he had generally used sal volatile for the same purpose. It did not so much assist in drying the tooth as it almost at once hardened the dentine and caused it to become brown.

Mr. Turner felt greatly indebted to Mr. Sewell for his suggestion. He had never been able to get a cavity so clean looking or so satisfactory in every way as he had been since he used absolute alcohol.

Mr. Sewell, in reply to Mr. Fletcher's remarks, thought it was less effectual to wipe a wet surface with chloroform than with dry cotton-wool, as chloroform had no affinity for water. As to the lining of varnish applied to cavities, he (Mr. Sewell) thought that any varnish that could be applied would be liable to decomposition. In reference to Mr. Coles's kind remarks on the subject of sensitive dentine, he might say that spirit had always been used for drying the sensitive dentine, which he thought could be accounted for by the action of the absolute alcohol on the contents of the dentinal tubes, which were the seat of sensation and were capable of being acted upon by spirit. They could be devitalized, and shriveled up, and dried on the surface by the absolute alcohol, and therefore in this way the sensitive dentine could be cured. The property of sal volatile turning softened dentine brown, mentioned by Mr. Tomes, was also manifested by absolute alcohol, which, he might add, was a common article of commerce and could be had of all druggists.

Mr. G. Henry related an incident which happened to himself. After removing a little tartar from below his lower teeth, a considerable irritation ensued at the neck of the tooth, which spread to the corresponding portion of the apex of the fang. It pointed, and matter was discharged. Two or three days afterwards, a little hard point worked out of the gum, which proved to be a very small portion of the alveolus which, in removing the tartar, had been chipped off. This showed how a foreign substance could set up considerable irritation.—*Odontological Society of Great Britain Reports, in Monthly Review of Dental Surgery.*

ALCOHOL IN DENTAL OPERATIONS.—This is one of the most valuable articles in the dentist's materia medica. I fear it is not so much used as formerly, excepting by the old practitioners. Thirty years ago it was in common use among the best operators. For myself, I was taught by my preceptor to use it for wiping out cavities in the excavation of decay; and the last thing, before inserting the gold, after the tooth was secured from saliva, was to thoroughly wipe the cavity with absolute alcohol. In destroying the pulp, the pulp-chamber and root canals were thoroughly sopped with alcohol after the removal of the soft parts. The ramifications of the pulp were not removed with as much thoroughness in those days as now, but the thorough application of alcohol to the root canals had the effect to dry up the soft tissues, and deodorize the cavity if decomposition of the latter had taken place.

Alcohol has such a great affinity to water that it removes the water from any soft tissue that it comes in contact with, and the latter will consequently become dry and hard, and shrivel up. Let my *young* reader try alcohol in this way on a dead nerve just removed from a tooth, and note its effect.

For hardening softened dentine, before the insertion of a filling, it is very useful, putting the cavity in much better condition than carbolic acid, creasote, or any other substance that I know of. My instrument-stand has not been without a two-ounce vial of alcohol for thirty-two years.

In the treatment of the pulp, if pepsin is used, alcohol must not be employed until we are through with the action, as alcohol will destroy the dissolvent qualities of the latter.—*Henry S. Chase, M.D., in the Missouri Dental Journal.*

CORK CAPPINGS.—During several years' extensive practice in gold filling, I have found cork to be decidedly the best substance to use for capping nerves, both on account of its indestructible and greatly superior non-conducting properties. I have been in the habit of treating small pieces with either *creasote* or *carbolic acid*, and then making one side *adhesive*, so as to retain it in position whilst filling the tooth, but owing to the considerable difficulty I experienced in cutting and preparing it had almost given it up. However, some time ago I chanced to mention it to a friend of mine, Mr. Hy. Peet, cork-cutter, and requested him to manufacture me some, which has resulted in his bringing out a very beautiful preparation, called by him *Adhesive Carbolized Cork*, and which I can most confidently recommend to the profession as not only the best possible nerve capping, but also as a great saving of valuable time, which alone, I think, will insure its being generally used.—*Gurnell E. Hammond, in Monthly Review of Dental Surgery.*

Celluloid.—We would have been gratified if we had been able to announce that celluloid could now be worked with almost as much certainty as rubber, and with but little more expense and labor, but we are constrained to state that we are fully satisfied from our own experience that it has the *advantage* of rubber in every particular. In beauty, there is no comparison to be made with rubber; in strength, we are satisfied from experiments that it has the advantage; in close adaptation to the teeth it certainly has the advantage of rubber; in cleanliness and healthfulness it is undoubtedly preferable to rubber. In simulating the color of the gums it exceeds by far anything that has ever been used for that purpose, except porcelain, and, indeed, it imitates the natural gums so closely in appearance that it will seldom, if ever, be necessary to use gum teeth for this kind of work. Next, it can be put up with considerable less labor than rubber, and, all things considered, at a less expense. It is true that the material costs more than rubber for a case of teeth, but take into consideration the fact that plain teeth can generally be used, and the difference of expense in teeth will more than compensate for the difference in favor of rubber in material for the plate, the expense for a whole plate of celluloid now being only sixty cents, and for a partial plate only thirty cents. The whole apparatus, flask and all, costs fifteen dollars, which covers the whole expense of outlay for one who has instruments and apparatus for working rubber.

We have made no statement here but which has been fully considered, and we say, without hesitation, that with the same care that is required to succeed with a rubber plate, success with the celluloid is certain. It is true that a little experience is necessary, as the manipulation is a little different from that required in working rubber, but the printed directions sent with each apparatus will generally suffice to make all plain, if they are carefully observed. There are a few persons, however, upon which a little more detailed explanation might be useful. If too great a degree of heat is used whilst pressing the plate, it will come out of the flask porous, just as rather thick masses of rubber will if they are vulcanized at too great a heat. Plates are mended with the greatest facility by moistening the new piece and the part of the plate to which it is to be attached with a saturated solution of camphor in alcohol. Hold the piece in position a few minutes, and it will adhere sufficiently to retain its place whilst pressing. Its durability has been tested to such an extent that there can be no question but that it is fully as lasting as rubber, and nothing remains to be done so far as the establishment of its entire reliability is concerned. For regulating plates, and indeed in every place where rubber as a vulcanite can be used, celluloid may with advantage be substituted for it. As there are no patents which lie in the way of its universal use, we commend it with confidence to the dental profession.

The above article was submitted to the St. Louis Dental Society, signed by H. Judd, Isaiah Forbes, Wm. N. Morrison, G. A. Bowman, Wm. H. Eames, C. W. Rivers, M. A. Bartleson, and indorsed in every particular by a unanimous vote of the society. — *Missouri Dental Journal.*

Spongoid.—We have been using this new absorbent for some time past, and can cheerfully recommend it for its absorbent properties. We find it very efficient and cleanly, and better adapted for some purposes than anything of the kind we have used.—*Missouri Dental Journal.*

HINTS AND QUERIES.

Can any one tell me how to soften the plaster in celluloid work after the case comes out of the press? This is the most difficult part of the process in working the new base.—H. H. B.

A Case in Practice.—On November 30th, 1874, Mrs. G., aged twenty-seven, called to have a tooth extracted. Examination justified its removal, which was accordingly done. The tooth extracted was the second left inferior bicuspid. After its removal, it left exposed a large amalgam filling in the anterior portion of the first left inferior molar, which had been there for several years, and decay had set in around the filling. As an excavator could be introduced around the margins, I made the patient aware of the condition of the tooth, and advised the removal of the amalgam filling and the insertion of a gold one, to which she consented.

I requested her to call after her gums had healed. On the 7th ult., she came to have the tooth filled. The amalgam filling was removed. The pulp was dead, and had sloughed off, the nerve-canals not having been filled. She said the tooth had not caused her any trouble that she remembered.

I prepared the nerve-cavities, pumped carbolic acid into them, and filled partly with cotton, finishing with Hill's stopping, leaving a small pledget of cotton saturated with carbolic acid at the apex of each root. Being too late in the day to complete the operation with gold, I filled the cavity of decay with Hill's stopping, and dismissed her until the next day.

When she returned there was a little soreness about the tooth, but not any more than generally exists after the application of the rubber dam. So considering it safe, I completed the operation with gold.

The tooth had caused but very little inconvenience until the 15th, seven days after it had been filled, when it became very painful, and an abscess formed and discharged without giving any relief.

On the 16th two physicians were summoned, who, after examination, diagnosed tetanus, and ordered the tooth to be removed. I was absent from home at the time. They sent for another dentist to extract the tooth. By the administration of opiates her jaws relaxed sufficiently to allow of the extraction of the tooth, but without any good result. She grew worse, and within an hour after the tooth was extracted, her jaws were perfectly rigid. Chloroform was administered, and the patient kept under its influence until the morning of the 18th when death ensued.

On examining the tooth after my return, I found a piece of gold about the size of a small pin's-head had protruded through the tooth (probably under the force of the mallet), as the bottom wall of the cavity was very thin at the center of the tooth and between the roots, which must have rested on a portion of the alveolus. I afterwards learned that her spine had been affected for several years, and that she had had an attack of "stiffening of the jaws" about five years ago. The patient was *enceinte* at the time of the operation.

I would like an expression of opinion in regard to this case, as to the cause of the tetanus; and in such cases the treatment which would be indicated.—A. J. N.

Remarkable Case of Replantation.—About six months since, a gentleman called, complaining of severe neuralgic pains through the right side of the face and temple, locating the commencement of it in the upper second molar, right side. He had an entire set of thirty-two teeth, and a handsomer or sounder set of teeth I have not seen in twenty-six years' practice: not a carious spot to be found, and the enamel of the finest and most compact structure. The tooth in question (the origin of the whole trouble) was very sensitive to percussion, and even to the touch of the tongue. He had suffered, he said, tortures for nearly a week. He had been under the care of an excellent dentist at Minneapolis. After a long and patient examination, I concluded to extract. I had to use both hands and *all* my strength, while an assistant held his head. The relief after extraction was not instantaneous, but gradual and permanent. I found the fangs entirely denuded of periosteum, and, upon breaking the tooth, the pulp entirely dead and in a state of putrefaction. I was at a loss to know to what to attribute the death of the tooth (as he was confident he had never received any blow or jar on or in the region of the tooth) until he told me what I now have come to the point of narrating. After the extraction he said, "You may not believe what I am going to tell, but it is true, and my uncle here will corroborate the facts, and to him am I indebted for finally saving my two front teeth. I have had these two teeth (pointing to the two central incisors) in my hand and tossed them from one hand to the other at half a dozen different times. The last time I had them out I was going to throw them away, but my uncle persuaded me to put them back and try them once more." I will now give the important points in the history of the case, as I learned them from him. His name is Earnest Nainlin, age thirty years, robust, full habit, and very fine physical form. Was an officer in one of our Minnesota regiments; was taken prisoner, and sent to Andersonville, June 19th, 1864. He was attacked with scurvy in August, and by the 1st of September all of his teeth were very loose. The two upper central incisors fell out about the last of September. He put them back. Afterwards they fell out at several different times, and he was finally on the point of throwing them away in disgust, when his uncle induced him to replace them once more. This was about the middle of October. At that time he had the good fortune to obtain a raw sweet potato; this he scraped and ate at intervals. In November, the teeth began to get a trifle firm in their sockets. On November 26th, he was paroled and discharged. From that time the teeth became firmer and firmer, until in February or March of 1865 his recovery was entire and permanent. His teeth are all firm, and no living dentist could at this day discover anything amiss with the central incisors or with any of his teeth.—M. B. Patterson, *St. Paul*, *Minnesota*.

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ORIGINAL COMMUNICATIONS.

CAUSES OF IRREGULARITY IN THE DEVELOPMENT OF THE TEETH.

BY N. W. KINGSLEY, D D.S., M.D.S., NEW YORK.

(Read before the New York Odontological Society, at the Special Meeting, December 14th, 15th, 16th, 1874.)

The subject of "The Treatment of Irregularities in the Development of the Teeth" is forcing itself upon the attention of the dentist with an alarming frequency. In no branch of practice does scientific knowledge seem to be sought with more avidity than in this direction. The tediousness of many of these cases; the inventive skill required to make successful appliances; the doubt always hanging over the final result; the lack of appreciation often of the highest order of professional skill; the absence of a prospective remunerative fee, as a stimulant; together with a want of knowledge of the causes operating to produce such an untoward result, combine to make these cases the "*bête noir*" of dental surgery.

As the highest order of scientific investigation is now directed more to the prevention of disease than to its remedy, no more important subject can now engage our attention, than an inquiry into the origin of these deformities, and of some means to be used to prevent their recurrence in our offspring. And here, upon the very threshold of our research, we are confronted with the paucity of our knowledge, and the feebleness of our abilities; for science never has and never can discover the primary cause of any one of the phenomena of nature. With all her efforts, she has succeeded in penetrating only a little further into the unknown, leaving the origin still as dark and mysterious as ever. Nevertheless, there are operations in nature which, for the purpose of science, may be denominated primary causes, which may be discovered, measurably controlled, and their disastrous influences averted.

Many of the forms of irregularity are directly traceable to inheritance, and are transmitted peculiarities. Probably in a very large proportion of cases where the irregularity in a dental arch is confined to one or two teeth. the primary cause, so far as that individual is concerned, is an hereditary family peculiarity.

The teeth of every person possess more or less individuality, and most of those peculiarities which stamp their individuality are inherited. The form and color of teeth, when not disturbed by abnormal influences, are derived from the same source.

Whenever we find any departure from what we are apt to regard as the typal form of each tooth, or any disproportion of size in their relations to each other, we shall be likely to find them peculiarities of descent.

The transmission by inheritance of a predisposition to a defect or a deformity, is the result of the same general law of nature which gives the form and features of progenitors to their offspring.

In the light in which we are now discussing this subject, it would be unprofitable to attempt to discover the cause of the minor peculiarities in dental development, which have clearly an origin in the ancestry of the individual. An investigation of this character would involve the discussion again of the "Origin of Species," and we should be compelled to admit,—as we have heretofore and must always hereafter,—that there lies a cause beyond all that we can comprehend, and which never can be reached by finite minds.

It is certainly a most wonderful subject for contemplation that, at some remote period in the history of our progenitors, nature departed from her normal type, and a dwarfed lateral incisor, a twisted canine, or an undeveloped bicuspid was the result; and following down the line of descent, we find precisely the same peculiarity appearing and reappearing; not always confined to the direct line, but continuing in the same family, by passing to the children of the brother or sister, and always presenting characteristics identical with the antecedent type.

"There is an ingrafted tendency in all living organized matter to reproduce itself."

It is yet to be determined whether the correction of the irregularities of the dental organs exercise any influence upon the offspring. That the correction of a congenital deformity in a parent will prevent its transmission, is no more to be supposed than would be the expectation that if we removed all the eyes from the present generation, the next would be born blind, excepting in so far that we have a right to expect that, in a transmitted deformity, nature will be making a constant effort to return to the normal type, while a created deformity would be by nature ignored.

Irregularities, either in the form of the arch or the position of the teeth, are very uncommon in the deciduous set. I have never seen an irregular arch in a child prior to the eruption of the permanent teeth, unless associated with and correlated to some other deformity. I have in a few instances seen a slight malposition of one or more of the incisors, sometimes of congenital origin, and sometimes the result of mischievous habits; as, for example, the two centrals may be pulled forward out of line by the prolonged use of an artificial nipple, sucking the thumb, or other similar habit. Of congenital deformities, it is rarely more than a trifling displacement of one or two of the incisors; but considering the temporary character of the deciduous teeth, and more especially the incisors, no irregularity in their position, that I have ever seen, can be regarded as having any material bearing upon the greater subject now under discussion.

They are to be classed as mere freaks of nature, not associated with nor indicating any other peculiarity in the child. Nor does it by any means prognosticate an irregularity in the development of the second set. This important fact cannot be too prominently borne in mind. The deciduous dental arch is always well formed, and the positions of the teeth are regular (mere freaks of nature excepted). And from this perfectly symmetrical dental arch there develops with the growth of the permanent set some of the most astounding abnormalities.

These peculiarities of the permanent teeth it is unnecessary to describe in detail. In the departure from symmetry they assume almost every variety of position, so that it would be almost impossible for the human mind to conceive of an irregular arrangement which would not find its counterpart in nature.

These variations are recognizable by every one of extended observation, and are deformities, because they are a greater or less departure from a normal standard. Such a standard cannot, in the very nature of things, be one shape to which all must conform or be classed as deformed.

Symmetry and harmony do not imply uniformity; and the dental arch may be developed up to the highest type of perfection, and yet there exist as great a variety of form as there would be in the faces of the aggregated beauties of the world.

Races, nations, and families are thus represented without deformity.

The normal type of the dental arch I conceive to be a regular line; the arch may be wider or narrower, varying somewhat in individuals or races, but the line would be an easy, graceful curve, without break or tendency to form an angle.

Within certain limits a narrow dental arch, as associated with certain features, may become the very perfection of beauty, while with another form of head and face the widest development may be equally pleasing. That which is recognized now as the standard or full measure of beauty, as well as of utility, is not unlike that which existed in the remotest historic ages, nor different from that which is now exhibited among all communities not degenerated by luxury or vice.

I have recently held a most interesting conversation with Dr. Nichols, who has spent twelve years in the Rocky Mountains and on the Pacific Coast, during which period he has examined the mouths of thousands of Indians and Chinese. He informs me that he never saw an instance of irregularity of the teeth in either of those races, with but one exception, and that a displaced canine in the mouth of a Chinese woman. The jaws of both races are universally well formed and amply developed. This is the evidence of an expert,—Dr. Nichols being a practitioner of dentistry. And this is also true of all semi-barbarous and savage races of good physical organization.

In 1864, Messrs. Cartwright and Coleman, of London, made an examination of some two hundred ancient skulls in the crypt of Hythe Church, Kent. These skulls, of which there is no authentic history further than that they have been there for centuries, were apparently of both sexes and all ages.

The maxillæ presented in all instances unusually well-developed alveolar arches. The teeth were remarkable for regularity of position, only two deviations being noticed; one upper canine shut within the lower jaw on occlusion, and one bicuspid was turned upon its axis, and there might have been other slight irregularities which were unnoticed; but in no single instance was there anything seen approaching to that which, under the term "contracted arch," so commonly exists in the present day.

The average width of the dental arch in these skulls from the outside of the first molar to the corresponding point was two and a half inches.

In 1869, Mr. John R. Mummery, of London, contributed to the Odontological Society of Great Britain the most valuable paper on this subject which I have ever read. I accord more importance to his personal examinations than I do to the observations of any man not a practical dentist. The statements of all others, even those of ethnologists, being less precise and more general in their character, must be accepted with some allowance. He examined all the available skulls of ancient races, and of modern uncivilized races, to the number of about three thousand, and tabulated more than one-half of them, which were classified as follows:

Ancient British, 203; Roman British, 143; Anglo-Saxon, 76; and Ancient Egyptian, 36.

Of modern uncivilized races: North American, 145; Polynesian, 204; East Indian, 223; African, 438; and Australian, 165.

From a careful analysis of the measurements given in his tables, I find that the average width of the dental arch from first molar across to first molar, in the skulls of ancient races, was a trifle less than two and three-eighths inches; the same measurement of the uncivilized moderns showed an average width of a trifle above two and a half inches.

The narrowest measurement given by him of any skull of any race is two and one-eighth inches.

The highest average of any race is nearly two and three-quarter inches, and these belong to the New Zealander, the Fejee Islander, and the Ashantees.

The narrowest average was found among the Hottentots and Bushmen of South Africa.

In these tables we have abundant evidence that the full measure and type of both dental and maxillary arches has been sustained among all peoples of simple habits and thoughts in all ages.

The standard of normality of the dental arch is a curved line expanding as it approaches the ends, and the teeth all standing on that line.

Abnormality will include such a shape of the arch as is not in harmony with the surrounding features; all crowding and twisting; and all departures from a regular line in the positions of the teeth.

Almost the only answer received by the dental student as to the cause of these irregularities has been "premature extraction of the deciduous teeth," and consequent contraction of the jaw; and this answer has been almost universally accepted without a question as to its philosophy. A few facts have been correlated, and a conclusion as unscientific as it is erroneous arrived at; and to the anxious inquiry of the parent has come the charge made against some other dentist of gross malpractice.

It is only within a few years that any one has been bold enough to doubt the universally accepted theory which so glibly accounted for every presentation of abnormality. Among those who have pronounced this ground as untenable, and publicly given their arguments, may be mentioned Messrs. Cartwright and Tomes, of London, and Dr. Forbes, of St. Louis.

Their arguments are based upon the deductions of science and the observation of facts, and are also confirmed in the experience of others.

The premature-extraction theory rests upon the supposition that the jaw-bone contracts upon the removal of the deciduous teeth. The fact seems to have been entirely ignored that the teeth and alveolar processes are a superstructure of the jaw-bone; growing upon it; fulfilling their destiny, and passing away without disturbing the foundation much more than an oak disturbs the planet upon which it has been sustained.

There exists a period in the history of the maxilla when it is itself an entity, and prior to hardly a trace of the subsequent superincumbent structures; and in the ordinary course of nature there comes a period at the other end of life when equally all trace of dentition is gone and the maxillæ remain an undestroyed entity.

While the proofs are conclusive that the jaws are developed independently of the teeth and alveolar processes, and that no ordinary surgical interference with the teeth or processes impedes or impairs that development, and while it may also be true that all the primary teeth may be removed long anterior to the period of eruption of the permanent ones without retarding their development or impairing their regularity, the doctrine may still be correct that the too early extraction of some of the temporary teeth will be likely to result in a crowded and abnormal condition. This result is not as likely to show itself with any other teeth as with the canines.

Let us look carefully into the order of the eruption of the permanent set in the regular economy of nature. It will be admitted that for every individual tooth of the deciduous set there is a permanent one lying underneath it in process of formation, and that in due time a deciduous tooth will loosen and fall out, and a permanent one will take its place.

In a normal state there will occur no interference and no irregularity. The central incisors will first appear; then the laterals; after that the bicuspids; and lastly the canines. Each predecessor of a permanent tooth will maintain its position until about the period of the emergence of its successor. There would be no contraction of the alveoli, because there would be no opportunity for it.

But taking now a disturbed, instead of a normal condition, let us see the result.

Remove for any cause one after another, or all at once, of the temporary set, and the period of development would not be interfered with, but the arrangement in the arch might be impaired.

The centrals would find a place without difficulty,—so would the laterals; the bicuspids would be pretty certain to have sufficient room, as their diameters are generally less than their predecessors; but when these teeth were all fully erupted, it would be found in a majority of cases at the present day that the first bicuspid and the lateral were nearly or quite in contact, filling the space destined for the permanent canine, which must now emerge either anteriorly or posteriorly to its true position, showing conclusively that if the alveolar arch had not contracted, the contiguous teeth had encroached upon the space destined for the canine, and forced it out of position. In either case it was the unquestioned result of the too early removal of the deciduous canines, for no one will doubt that, had the temporary canines been allowed to remain, they would have prevented contraction of the alveolus or an encroachment on their domain. It may be argued that if the original direction of the canine was correct, it would force itself between the lateral and bicuspid, thus making way for itself; but this is against the experience of nearly all observation, and very naturally so. Admit the fact that from some cause or other the bicuspid and lateral come into contiguity, and from the tardiness of the erupting canine, it will find solid and unyielding roots to contend with, which will necessarily force it out of the dental arch.

Mr. Tomes relates a case in which he removed, for cause, from a child, all of the deciduous teeth prior to the eruption of any of their successors, so that for a time the gums were edentulous; nevertheless, in due time the permanent teeth developed in perfect regularity of sequence and of symmetry.

While Mr. Tomes's report shows that no abnormality followed the removal of all the teeth at once, such a result is to be feared from such a practice, and most certainly will ensue if there be not a coincident, independent, and ample development of the maxillæ. Cases are coming constantly under our observation where from some cause the temporary canines have been sacrificed, the space closed up, and the permanent teeth malposed, with little hope of their ever assuming, unaided, their rightful positions.

From this there can be but one deduction,—which is, that whatever may be the inducement to remove any or all of the deciduous teeth prior to their period of shedding, the canines should be retained until there is ample evidence of the early emergence of their permanent successors.

How much of the malposition of the permanent teeth is due to the prolonged presence of the temporaries, is, I think, still an unsettled point.

Although absorption may be proved to be an independent process, and in no wise connected always with the progress of an erupting tooth, nevertheless, the cases are so common in which the absorbed portion of the deciduous tooth corresponds so accurately with the new crown, as to force upon us the conviction that it is influenced by it, and therefore that if the permanent tooth had persisted in the right direction the deciduous tooth would have become displaced.

The question very naturally arises, Is the presence of the deciduous teeth the *cause* or the *effect* of the irregularity? If their presence be the cause of irregularities, then it is manifest that in this generation of malposed teeth it is our duty to anticipate the trouble, and at an early day remove them, before even it is possible for them to give a wrong direction to their successors. Whether their presence be the cause or the result of the malposition, this we do know, that when a permanent tooth has erupted, and its deciduous predecessor has not been removed, the immediate extraction of such tooth will go very far toward the complete correction of the deformity.

I do not see in this very common fact any greater evidence that the presence of the temporary tooth caused the irregularity than that the position and tendency of the permanent tooth was originally wrong. It is quite as reasonable to adopt the latter view as to suppose that the function of absorption was arrested, and by that the tooth was turned aside.

In seeking information of the causes of irregularity more with a view of discovering some means of prevention than of correction, it was with some disappointment that I read Mr. Tomes's explanation of certain abnormalities which he had observed, described, and treated.

For example, in describing cases which are not uncommon where the upper front teeth project unduly, shutting over the lower lip, he says,—

"The deformity may result from excessive development of the alveolar processes of the anterior part of the upper jaw, but more commonly we shall find that the molar teeth are unusually short, thereby allowing the incisor teeth of the lower to press unduly upon the inclined lingual surfaces of the teeth of the upper jaw. The upper teeth, yielding to the pressure, are forced outward, and are retained in the malposition by the teeth which have led to the displacement. If, in cases resulting from the latter cause, the inquiry be extended to the condition of the lower jaw, it will be found that with the short molar teeth we have a short alveolar range and short rectangular ramus. This conformation is probably the primary cause of the mischief."

Again he says,—

"The condition under consideration may also arise from the tardy eruption of the molar teeth leaving the incisors to act for a time upon each other, as they do when from any cause the back teeth are lost. Then again, the incisors of the lower jaw may attain an unusual height, or they may project in an unusual degree, and produce the mischief. Or the result may be consequent upon a regular linear arrangement of large teeth in a jaw having a small alveolar base, in which case the teeth prior to their eruption will assume an unusual anterior obliquity."

But may we not very pertinently ask, What was the cause of the "excessive development," the "short molar teeth," the "short alveolar range," or the "short rectangular ramus?" The explanation can be regarded in no other light than a description of antecedent phenomena, but the origin of the deformity has not been reached.

In a paper read before the Odontological Society in London in 1864, Mr. Cartwright says,—

"Want of space in the bones of the jaws may be defined as the true cause of irregularity in the position of the teeth in the majority of instances;" and follows this statement immediately with an inquiry as "to a satisfactory explanation of this want of capacity in the jaws of people of certain communities."

He further says,—

"Irregularity is uncommon among many, if not most, aboriginal peoples and tribes, and also the inhabitants of particular districts and locations. Take the aborigines generally, North American Indians, Africans, Caffres included, and Asiatics.

"Irregularity is common in most highly civilized communities, and especially so among the upper and middle classes, and it is more constant among the inhabitants of towns than it is among the inhabitants of agricultural districts."

Mr. Cartwright then offers the hypothesis that this abnormality is due to a process of breeding, and brings forward Mr. Darwin's statements that the bones and plumage of birds become altered by such a process.

He further supports his position by the results of high breeding among animals, which is maintained by constant and careful selection of such as possess particular points and characteristics.

For instance, he says, "Take the horse and the ox, and consider the points which make up a thoroughbred animal, the small head and ears, the thin legs, small fetlocks and feet, the necks and bodies finely and symmetrically proportioned, and then the narrowness and comparative smallness of the maxillæ. From the results obtained by high breeding in animals, they might reasonably argue that small jaws might be a characteristic of breed in certain conditions of life. If they compared two types of human beings, represented by the upper class in one case, and in the other case by a large class of which the prize-fighter furnished an apt example, they would find as a rule in the first: well-shaped lips, a small oral orifice, high and capacious forehead, well-pronounced chin, ears small, and neck long; the ankles, wrists, feet, and hands small; with an expression in which the intellectual predominated over the animal;" while the other class, represented by the prize-fighter, presented exactly the opposite characteristics.

The hypothesis of Mr. Cartwright is not without reason;* and yet it is not altogether an explanation of the present phenomena, for the laws which govern selective breeding in animals do not apply to man in any condition in which he is now found. These principles would, without doubt, produce precisely similar results if applied under similar conditions.

Regard man as an animal only; dismiss all cognizance of his intellect and his affections; mate him to the woman with sole reference to the physical development of the race, and it would take but a few generations to see disease and deformity swept from the face of the earth. But to call the intermarriage of families, whose brains have been stimulated to their highest capacity and whose physical and nervous systems have been deranged by the habits of modern civilization,—to call such a mixture high, or "selective breeding," is a perversion of the term. If the application of these principles produces a delicacy of form in the whole physique, we should reasonably expect to find a corresponding delicacy and refinement in the condition of the dental organs.

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* It is more than probable that Mr. Cartwright uses the term "*selective*" here in its broadest signification; meaning the mixing of peculiarities or types which have a tendency to depart from normality, and not in its more restricted and limited sense of combining only excellencies, as the term when applied to breeding is commonly understood.

That the process of selective breeding should tend to, or end in, deformity, is manifestly inconsistent with its prime object, which is the elimination of everything which tends to degeneracy or deformity.

The characteristics pointed out by Mr. Cartwright in his illustrations from animals are conspicuously æsthetic.

We can conceive of no such force acting uniformly upon the whole physique, and producing such æsthetic results without its influencing equally the dental organs, and thus there would be not only no irregularity or abnormality, but enhanced beauty,—more symmetrically formed, more symmetrically arranged, and more symmetrically related dental organs. We are therefore irresistibly led to the rejection of the theory of "high or selective breeding," in its true signification, as exerting any direct influence upon the malposition of the permanent teeth, and while the facts noticed by Mr. Cartwright are in consonance with other observers, we are forced to the conclusion that such abnormalities are not a necessary result of a higher civilization and refinement, and that they are only coincident and correlated thereto.

There is a kind of breeding which does undoubtedly produce abnormalities of the kind under discussion. It is a manifestation not uncommon in this country of mixed nationalities, but it can hardly be called *high* or *selective* breeding. The laws of inheritance, confirmed by common observation, show how constant is the mingling in the offspring of the traits of character and the peculiar features of two diverse races brought together in marriage.

This mixing, without blending or harmonizing, is productive of deformity in character and deformity in physique. Thus, so far as the jaws and teeth are concerned, they may exist in each parent in perfect symmetry,—in one parent the jaws and teeth are large, in the other parent both jaws and teeth are small; but each in its way is a normal development. If, now (and for which we can give no reason), the small jaw of one parent and the large teeth of the other appear in the offspring, deformity is sure to follow; and in any efforts made thereafter towards correction, these facts must be taken into consideration.

In examining the maxillæ of a child between the ages of four and seven years, with the external walls removed, so as to expose the developing permanent teeth, we shall be struck with the advanced stage of growth which the crowns have attained, and with the crowded and jumbled condition in which they are placed. Of such an exhibition Professor McQuillen made the following remark:

"When examining a series of jaws of different ages, arranged so as to show deciduous and permanent teeth, it is not a matter of surprise that there should be irregularity in the permanent set; but, when observing their crowded and irregular arrangement in the jaw prior to eruption, it is rather a matter of astonishment that they should ever assume a regular and symmetrical appearance."

In *our* investigation we will observe that while there is no transposition of these crowns—each one maintaining its individual locality—they nevertheless stand in almost every variety of position. They will be seen deflected within or without the line, twisted, lapping, and sometimes completely overriding one another.

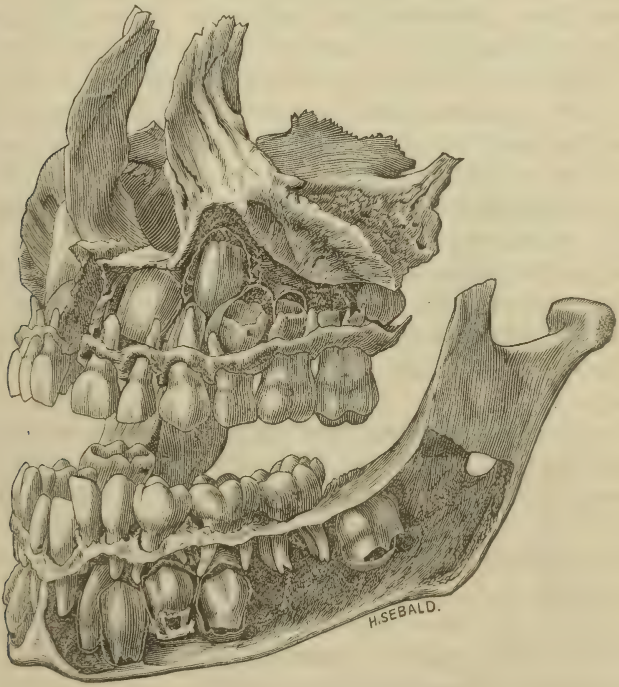


FIG. 1.

In the specimen now before us (see Fig. 1), the lower permanent central incisors have recently erupted, showing the age to be about seven years. Their predecessors are the only ones of the deciduous set which have been removed. The general contiguity of the temporary teeth shows that but little enlargement of the dental arch had taken place, while the presence of the crowns of all the permanent teeth (the third molars excepted) is an ample illustration of the crowded confusion and disorder which has been described. In the upper jaw the left central incisor is partially twisted; both of the lateral incisors are within the arch, and, if continued on the same line, would shut within the lower jaw.

The crowns of the canines override and are in front of the laterals, and in contact with the central incisors save by a thin partition of process.

The first bicuspids on each side are in close contiguity with the laterals. The crowns of all the bicuspids are either twisted or tipped in such a way as to show that some new direction must be given to nearly every tooth, or irregularity of the most pronounced character must ensue.

The general condition of the lower teeth is not dissimilar to the upper ones, and this example is not an exceptional case.

These crowns, we shall also observe, are of their full diameter, and that they are placed upon a maxilla which at this age has not developed sufficiently to allow them to range side by side upon a true dental line; hence, they must remain in this crowded and irregular condition until the maxilla itself has grown large enough to allow the change.

It is now an established fact that the development of the teeth and processes and the development of the jaws are two distinct and independent operations.

The maxillæ will go on in their growth until they have reached the measure prescribed by the Creator, whether a tooth develops or not, and likewise the teeth will grow into undiminished crowns and erupt either in order or disorder, whether the maxillæ increase or remain stunted.

I examined a few years since the mouth of the celebrated dwarf, "Tom Thumb." I found the teeth those of a man in individual size; but the maxillæ, in harmony with the rest of his osseous system, were dwarfed. The result was what we should naturally expect,—a most marked malposition of the teeth,—so much so that he said he "had a double row of teeth all around." And this is uniformly the case with dwarfs where the whole physique is symmetrically dwarfed. The converse is also true of giants, except in those cases where the extraordinary stature is a characteristic of race.

To such an extent are these observations in accordance with both science and fact, that it is quite possible to judge of the nature of both these monstrosities, whether they be congenital, hereditary, or *lusus naturæ.* If, upon the examination of the fully-developed teeth of a giant, I found them large, regular, and in a well-formed arch, the whole in harmonious relation to his other enlarged features, I should have little hesitation in pronouncing him a congenital giant,—a large man by nature, and belonging to a family or race of giants. If, on the other hand, I found the teeth the size of those of a man of ordinary stature, and standing apart from each other in an enlarged jaw, I should pronounce him the result of forces which did not antedate his own existence, but continued their power long after the development of the teeth after their hereditary pattern had been completed. And in like manner a dwarf belonging to a race of small stature would not necessarily show irregularity or crowding of the teeth, but would be expected to show a reduction in size of the dental organs in consonance and in harmony with the type of his race.

This is but a confirmation of the theory of the independence of these organizations; the evidence from a variety of sources going to show that the forces which preside over the growth of the osseous system are separate and distinct from those which originate and develop the dental organs, and that while in a normal state both teeth and jaws would grow in harmony, in an abnormal condition the teeth might be far in advance of the growth of the jaws, or they might be equally retarded.

If the former, they must erupt in a crowded condition; if the latter, they would, other things being equal, be likely to be in line.

In recognizing an antagonism, I cannot but be impressed with a similar contest going on, more or less frequently, between the mental and the physical development,—between the brain and the body. In the normal state of man these two systems are found working in harmony; in the present refined or degenerate state, each is fighting for supremacy, with the odds in favor of the brain.

No one of extended observation will hesitate in believing that there is a faculty or power at work, modifying materially the physique of the present generation, altogether inexplicable by the too commonly asserted influencing power of climate, hygiene, or diet. One of the most alarming characteristics of the present age and the present civilization is found in the rapidity of its movements and the activity of its mind; in the larger aggregate of highly-organized and excessively developed nervous systems, and in the increasing tendency to nervous and brain diseases.

As the peculiarities of progenitors in mind, temperament, and physique, are by nature stamped upon their offspring, we see a generation of children inheriting a tendency to a nervous exaltation which very slight favoring circumstances encourages and stimulates. This is unquestionably more noticeable in the centers of luxury in this country than in any other portion of the civilized globe. Fathers who are under a mental strain to the very verge of insanity transmit that exaltation to their offspring. Children are no longer children, except in their immature physical development; and thus, if not in all instances an absolute intellectual precocity, we have relatively a mental and nervous development far in advance of the physical. Hence, if the mental is only up to the average of its years, we will find it associated with anything but a robust physique; and the contrast remains the same. I shall show that one of the manifestations of this precocious, highly-organized, and exquisitely-developed nervous system is its influence upon the development of the teeth, while the physical system is following in tardy but vain efforts to keep pace with it.

My proposition then is this: laying aside all cases that may be due to an inherited tendency to follow or exaggerate some given type, together with those which are manifestly due to forces operating only after eruption; the primary cause, so far as the individual is concerned, of any general disturbance in the development of the permanent teeth, showing itself particularly in their malposition, is directly traceable to a lesion or innervation of the trigeminal nerve; that it is an interference, more or less prolonged, with one of the prominent functions of that nerve, and operating at its origin; that while I know of no way to prove this assumption by any examination, microscopical or otherwise, while the nerve-center is under this influence, it is nevertheless sufficiently proven by secondary phenomena which could only have originated from such a source.

The function of the trigeminus thus stimulated or interrupted is that which supports, regulates, and governs the nutrition of the tissues to which its terminal branches are distributed.

That such a lesion or innervation would be likely to produce such a result, is clearly foreshadowed in the following statement made by the late Professor Anstie in one of his lectures on the fifth nerve, as follows:

"The nervous center in which the trigeminus is implanted is, of all nervous centers, the one which, in the human subject, is most liable to congenital imperfection of the kind which necessitates a break-down in its governing functions at special crises in the development of the organism."

I do not find in any of my reading that any author on the causes of malposition of the teeth has made this direct connection between the abnormality and disturbance of the nerve center during the formative and eruptive period; but I do find a large array of facts, confirmed by my own observations, which point in my own mind to this only conclusion, and although other observers of similar facts have attempted in many instances an explanation of what they saw, they have failed to refer them to any satisfactory *primary* cause.

In Mr. Mummery's paper, before referred to, in speaking of *diseases* of the teeth, he says, "It is to be feared that a large amount of dental disease is originated by overtaxing the active brain of children. According to the best authorities, the most rapid increase in the growth of the brain takes place before seven years of age; and it must be remembered that the crowns of all the permanent teeth, with the exception of the third molars, are simultaneously in the course of development with this great advance in the size of the brain. May we not, therefore, reasonably suppose that through the diminished vitality consequent upon this diversion of the formative energy from the teeth, by premature mental exertion, these organs necessarily become degenerated, and that this circumstance constitutes one great difference between the teeth of the intellectual and those of the uncultivated families of mankind?"

Dr. Nathan Allen, in his remarkable discourse delivered before the Massachusetts Medical Society, commenting upon the change going on in the human organism of the present day, says,—

"This change indicates the existence of less muscle, more nerve; less physical vitality, more nervous energy; less power of endurance, but more mental activity.

"This same change is also indicated in the anatomy and physiology of the person. The framework of the body generally is not so large, is not so compact, nor so well proportioned; the countenance is paler, the features are more pointed and not so expressive of health, though more so of intelligence. The texture or quality of organization is more delicate and refined; the brain is becoming developed more and more relatively, and too frequently at the expense of the body; or, in other words, the nervous temperament, with all its advantages and disadvantages, is becoming too predominant for other parts of the body. As one of the consequences we have more diseases of the brain and nervous system, more sudden deaths from apoplexy, paralysis, and also from diseases of the heart. . . .

"The removal of so large a proportion of the population from the country and rural life to cities and large towns; the change of employment from farm-work,—from out-door exercise and the more laborious mechanical pursuits,—to lighter kinds of business, with increased exercise of the brain; add to this the greatly increased strife, excitement, and competition in every department of business and society,—all these changes must serve gradually to diminish muscular power and the general vitality of the system. No truth in vital statistics is better established than the fact that large cities and a dense population tend to diminish the physical energies of the body and shorten human life. . . .

"The simple reason is, as we conceive, that their style of living taxes the brain altogether too much; it develops a great predominance of the nervous temperament at the sacrifice of other parts of the body, which by inheritance is increased from generation to generation. The balance of structure and harmony of function in organization is radically changed, and carried to an intense development of nervous tissue, which in its very nature is unfavorable to the procreation of offspring. . . .

"But it is in the accumulated, the intensified effect produced by the law of inheritance, that the most striking and destructive results are to be witnessed."

My argument from this now almost universally recognized condition is this: during the formative and eruptive periods of the permanent teeth they are under the influence of an independent and peculiar vital (nervous) force; this innervation pushes on their development regardless of the more tardy growth of the osseous system; being implanted in a crowded position, in undeveloped maxillæ, they never have an opportunity to recover from it, and emerge in the same disordered arrangement in which the crowns were formed.

The correlation and the connection would seem to be unmistakable. Under such circumstances it would not be expected that any or all organic changes in the nerve center would manifest the same results in detail; a disturbance of function would produce general results, the details of which might vary in every case.

That such a lesion or innervation could only operate upon the permanent teeth is easily seen, when it is remembered that to produce any marked effect upon the deciduous teeth, we should have to go back to intra-uterine life for the period of its influence, and before the child had an independent and sentient being.

This hypothesis does not find any seeming contradiction in our daily observation, for such a disturbance of nerve function might occur only for a limited period, and no other exhibition or evidence of it ever again appear.

In meditating some time since upon the subject, I came to the conclusion that, if my deductions were correct, I should find proof of it in an examination of individuals of sluggish or feeble intellect, and at that time I wrote this sentence:

"In an examination of idiots, we shall be likely to find capacious jaws and teeth not crowded."

If a precocious or stimulated brain in infancy urges on and crowds the dental organs in advance of the growth of the jaws, then a brain of low calibre, or power, will be likely to have associated with it a retarded dentition, but with abundance of room.

After this conclusion of my own, I came across a paper by Dr. Langdon Down, Physician to the Earlswood Asylum for Idiots, near London, and read before the Odontological Society of Great Britain.

Dr. Down's statements, founded upon his observations of nearly a thousand feeble-minded patients, were so astounding, and so at variance with my theory, that the picture which I had painted seemed to vanish like a vision.

His most startling statement was embodied in these words:

"A marked character of the teeth of idiots is their irregularity as to position. They are often crowded,—so crowded as to present their sides instead of their anterior surfaces.

"They are often arranged on different planes. The canine teeth are frequently unduly prominent, and a marked sulcus is sometimes seen between the incisors and canines, with prominence of the incisors. . . .

"Of the most significant value, however, is the condition of the palate. I have made a very large number of careful measurements of the mouths of the congenitally feeble-minded and of intelligent persons of the same age, with the result of indicating, with some few exceptions, a markedly diminished width between the posterior bicuspids of the two sides." . . .

"One result, or rather one accompaniment, of this narrowing, is the inordinate vaulting of the palate. The palate assumes a roof-like form. The vaulting is not simply apparent from the approximation of the two sides; it is absolute, the line of junction between the palatal bones occupying a higher plane. Often there is an antero-posterior sulcus corresponding to the line of approximation of the two bones." . . .

So constant and universal did Dr. Down state that he found irregularities of the dental organs of one form or another, that he relied upon the evidence of the mouth as a valuable factor in making his diagnosis of the character of the idiocy. This essay, coming from so distinguished an authority, called forth an article "On the V-shaped Contracted Maxilla," from the pen of Mr. Charles Tomes, who undertook to trace these phenomena back to their origin and explain them.

This contracted or V-shaped arch, I gathered from Dr. Down's paper, was the most inimical and the most pronounced of all deformities of the dental organs, and this statement in particular was the most contradictory of my own hypothesis and of my personal observations; for during a period of twenty-five years I had been noting and treating all forms of abnormalities, and the V-shaped or contracted arch was universally associated with a higher order of intelligence. On the very day of this writing, I examined the mouth of a lady in which there was seen contracted and V-shaped arches in both upper and lower jaws of most decided character. The lady was one of unusually well-balanced mind and of a superior order of intelligence. No ordinary observer could possibly associate any feebleness of intellect with the abnormality in the person of this lady.

To gather evidence from a more extended field, and, if possible, to reconcile seeming inconsistencies, I undertook an investigation which has been continued with more or less interruption until the present time.

In entering upon an investigation of this kind, with a view of demonstrating a fact in science, it is of the utmost importance that there be no ambiguity of language or terms.

I have heretofore spoken of the normal type of the dental arch being a regular curved line.

I wish now to state that the absolutely, perfectly regular line is very rarely found in either ancient or modern skulls. To be more explicit, it will be found that nearly every case which would be pronounced regular by an expert on looking at it, will show variations when put to a mathematical test.

For instance, if a piece of soft wire be bent around the outside of the circle so as to touch every tooth, it will show places indicating that certain teeth are either within or without the line, and yet the deviations are so little as to be hardly observable by the ordinary critic.

Such deviations as this I do not class under the head of irregularities, because they are no more out of the limit of normality than are the varieties of feature in different members of the same family.

Furthermore, it is not certain that they are in any sense developmental in their origin, and if not they cannot be used as an argument in an investigation into development.

My own opinion is that, with the exception of inherited deformities, almost all cases of slight peculiarities of position result from the accommodation of articulation with the opposing jaw.

We remember their anomalous position before eruption; if they continued to grow in the same direction, great general disorder would be the result.

That they ever come perfectly into line, is due partly to the enlargement of the jaw encouraging it, and partly from articulation with the antagonizing teeth on occlusion. As it is only *inclined* surfaces that come in contact, we can readily see that a jaw which has the full measure of natural tendency to regularity, may thus show some deviations, as the permanency of the structure is attained.

A peculiar rotary movement in masticating, when teeth are erupting, may be sufficient to throw a bicuspid ever so slightly out of position, which malposition may be considerably increased or it may be corrected, by contact with the opposite tooth on occlusion.

In the investigations I am about to describe, I used pieces of thick card-board cut about two and a half inches square, which were inserted in the mouth, the teeth closed, and with a pencil a line was drawn around the circle and close to the teeth. In such a diagram both the size of the arch and its form can be studied.

My first visit was to the inmates of the Asylum for Idiots upon

Randall's Island, numbering about two hundred. The result was as follows:

I did not see a single pronounced case of V-shaped dental arch; I saw but very few cases of narrowed palatine arch; I saw but three or four of saddle-shaped palates, *i.e.* where the sides of the palate approximated in the bicuspid region.

I saw but little irregularity in the positions of the teeth; very few teeth that were out of line, whatever that line was; what little malposition there was, was generally confined to the six front teeth; of these six, the lateral incisors were more generally at fault, being inverted, everted, or twisted. It was not a common thing to find the canines out of line.

Many of the malposed cases were those where the teeth were still erupting, and did not show such abnormal position that I would have felt justified in interfering if the patient had been brought to me for treatment. There was every reason to hope that, when fully developed, they would appear in good position. There were also many cases of retarded dentition.

There was no more irregularity, decay, loss of teeth, or neglect, than I have seen in the same number of youth picked up from the street.

The prevailing impression was, that I had seen an unusual number of well-developed jaws; they would average larger than the fully-developed jaws of the average of my patients; and that they were above the average for density and probable durability.

The dental arch was generally a broad and regular curve; the variations from this, but within the range of normality, were a smaller circle, anterior to the bicuspids, and straighter lines behind them.

The lower jaw corresponded with the form of the upper in nearly every case, and therefore the articulation was almost always *good*.

There were three or four cases (the ones with saddle-shaped palates) where there was a narrowed or somewhat pinched condition of each side against the first molar, with which the lower jaw did not correspond, and the lower teeth articulated there outside the upper ones. There were no cases (save that of John Rowse) where there was any more deformity of contracted sides than is seen in the cases which I have treated, and which are described and illustrated in *Johnston's Dental Miscellany* for the current year.

Associated with the last-named peculiarity, there were four or five where the superior incisors appeared tipped up, as in the so-called thumb-sucking cases, and which it is quite possible were caused by sucking habits; in some of them a vertical gap, of from one-quarter to three-eighths of an inch, between the incisors of both jaws when the teeth were closed, was observed.

There were several cases where the arch was well curved upon the right side, but the left side showed a variation from that curve and a depression of the line. There were more cases where the arch was depressed on only one side than upon both.

I did not see a single case in which there was any abnormality of size or shape of the jaws before the eruption of the permanent teeth.

I was informed that a very considerable number of these patients are of Hebrew extraction. The others are made up from nearly all civilized nationalities.

These conclusions differed so much from Dr. Down's observations, that I almost doubted my knowledge of what constituted normality, and what constituted depravity.

To familiarize myself further with the subject, I went into a somewhat extended investigation of different classes, conditions, and races. In the youth of our public schools, above twelve years of age, I found ample facilities of one kind, and among the various nationalities and races represented in our metropolis, I carried the investigation further. For example: I hunted up every "*Heathen Chinee*" that I could find in New York (and there is a colony of about three hundred), and took a diagram of his mouth. Recently, while spending a number of weeks in Switzerland, I devoted some time to an investigation of Cretinism, and later I obtained authority from the Public Administration of Paris to visit the asylums and hospitals, and make an examination of idiots.

Assisted by Dr. John W. Crane, who rendered me most valuable aid, I made a personal examination of between three hundred and four hundred idiots, with a result in nowise dissimilar to that narrated somewhat in detail of the asylum on Randall's Island, and therefore unnecessary to recapitulate.

By a comparison of my observations of idiots with that of all ranks and conditions in life, as represented in our public schools, I found that, take the idiots as a class and compare them with the lower orders of society as found in this country, and there were no more irregularities in the one than in the other.

In both cases did I find that amply-developed jaws and teeth were the rule, and narrow, pinched, and V-shaped maxillæ and dental arches were the exception. And this was equally true of the Idiots in France and of the Cretins in Switzerland, among whom I did not see a single case of narrowed arch or high-vaulted palate.

From conversations with those in charge of the education of the idiots, I was able to note the intellectual status of the patient and the corresponding condition of the dental organs. It was thus I discovered, that in those cases where there was a fair physical constitution and development, the intellect in a progressive state, and considerable hopes entertained of mental improvement, the jaws and teeth were in a normal condition. As the scale descended until we arrived at that melancholy condition of absolute idiocy, upon which all improvement was hopeless, I found jaws and teeth, and, in a measure, the whole physical condition, degenerate. Thus did I see the extremes and the gradations, beginning with a sluggish or feeble mind, in a fair organization with well-developed jaws, descending in regular sequences through all the grades of imbecility to unconditional vacuity, associated with corresponding disorganization and degeneracy of the teeth, jaws, and whole physical system.

The accompanying cuts represent casts illustrating these extremes in the dental development of idiots. Both these subjects were found in the Asylum on Randall's Island, and both are congenital idiots.

Fig. 2.

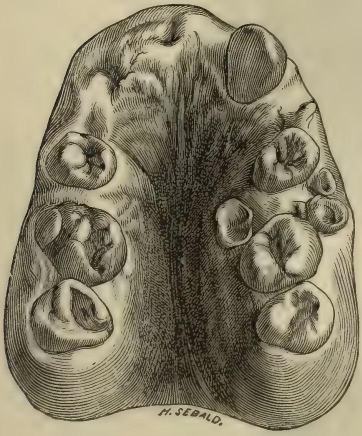
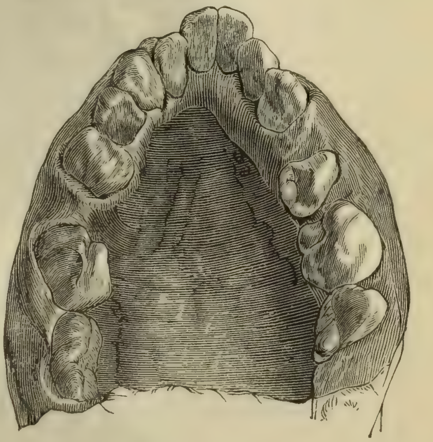


Fig. 3.



Figs. 2 and 3 show the form of jaws and arrangement of teeth in the mouth of John Rowse, an idiot of the lowest type and incapable of improvement. He was born in 1843, weighs now seventy-two pounds, and is four feet seven and a half inches high.

Figs. 4 and 5 represent the jaws of a boy fourteen years of age, of full average height and good physical organization. The record shows him to be "disorderly and wild; incapable of improvement under special training."

This experience had been so uniform on both sides of the Atlantic, that it was with feelings of hesitation as well as of desire, that I accepted an invitation from Dr. Down to visit his asylum, near London, and see for myself the evidence upon which his convictions were based.

Together, we made a careful examination of every inmate of the institution, with a result not so widely different as I had supposed must exist.

There were, to be sure, a larger percentage of irregularities of the teeth than I had before observed. About five per cent. might be said to be pronounced cases of narrowed or V-shaped arches, and another five to ten per cent. might be said to have more or less tendency in that direction, but of the more positive cases I did not see one so marked as I have seen and treated in private practice, and associated with full intellectual development.

FIG. 4.

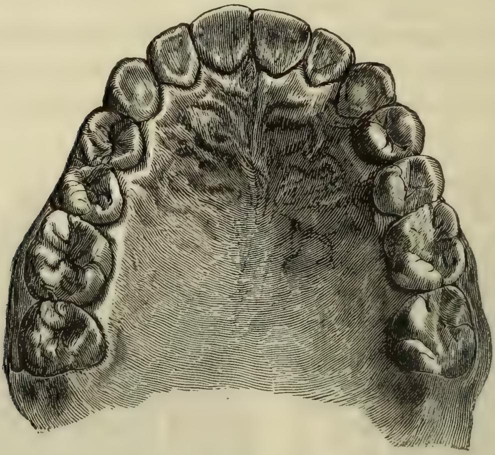
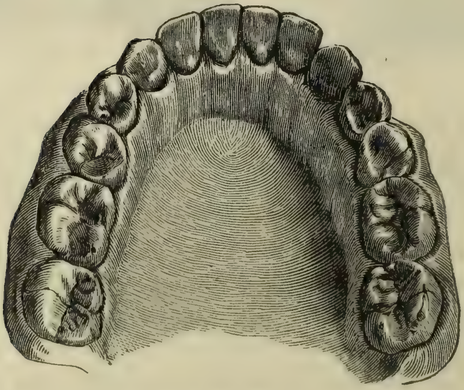


FIG. 5.



Of the total number, I could not pronounce one-half, or fifty per cent., as showing an irregularity of dental development out of the range of normality, or that might not have arisen from accidental causes operating on the crowns of the teeth after eruption, and therefore only incidentally connected with idiocy, and in nowise correlated thereto.

In justice to Dr. Down, I must say that I found in him an enthusiastic co-operator, without any pet hobby to sustain against evidence, and only too glad to obtain aid in his investigation into the symptoms of idiocy from any source.

It was with the hope of obtaining aid that he went before the Odontological Society, with the expectation that the observations of experts in dentistry would throw some light upon the subject.

In this way only is to be accounted for the difference of opinion which existed between us upon many cases which seemed to him an unduly high vault to the palate, narrowed arch, or irregularity, but which, to my eye, came clearly within the limit of normality. Nevertheless, there was no mistaking the fact that there was a larger percentage of the kind of deformities which he had described, than I had found in any other collection of idiots. This fact was the less contradictory of my former experience, and the less puzzling, when I learned that nearly all the cases which I had seen were the offspring of noble families, or of the higher orders of society, which, in Great Britain, are more strongly marked than in any other portion of the civilized globe.

From one of Dr. Down's conclusions I must still dissent. In his essay, he says, "It was in my inquiry into the condition of the teeth and mouth especially, that I arrived at the conclusion that, in by far the larger number of instances, I was able to indicate the period at which the depressed condition commenced, and to predicate in some degree the amount of improvement which physical, intellectual, and moral training might possibly effect.

"In children where idiocy is accidental, arising from causes operating after uterine life, there is but slight deviation from normal condition in the state of the mouth and teeth, while it is in those whose malady is congenital, especially where arising from causes operating at a very early period of embryonic life, that the deviation of the mouth and its appendages from a normal condition is most pronounced."

I cannot see any connection between these phenomena and causes acting especially "at a very early period of embryonic life;" when we consider that the deciduous teeth are well placed, and that it is only after they pass away that abnormality appears, also that it is only at the very latest period of embryonic life that even the germs of the permanent teeth are found, it is difficult to conceive the connection or correlation.

If the cause antedates the birth of the child, I should seek for its origin, not during the intra-uterine life, but as a like deformity existing in the progenitor, and associated with a *tendency* to idiocy,—developing into idiocy in the child, and carrying with it the physical deformity of the parent.

If there was always a disturbed condition of the deciduous teeth, we might pronounce on the congenital origin of the idiocy without hesitation, but when we find the deciduous teeth regular, and the permanent ones only irregular, we cannot find in this, evidence of early embryonic disturbance.

With the panorama before us of the development of both sets, we can only say with confidence that the abnormality of brain did not influence the position of the teeth until about or after the period of birth, —being the period covered by their growth.

Not long since, Mr. C. S. Tomes published an ingenious and somewhat elaborate theory, "On the Developmental Origin of the V-shaped Contracted Maxilla," basing his arguments upon the investigations of Dr. Down.

Instead of accepting his hypothesis as justified by the premises, I am confirmed in the belief that wherever such abnormalities as he describes appear in unmistakable congenital idiots, they will be found peculiarities of transmission by inheritance,—like deformities existing in the ancestry.

Again, Dr. Down says, "An appeal to the condition of the mouth is an important aid in determining whether the lesion on which the mental weakness depends is of intra-uterine or post-uterine origin. In the event of the mouth being abnormal, it indicates a congenital origin: while if the mouth be well formed, and the teeth in a healthy condition, it would lead to the opinion that the calamity had occurred subsequently to embryonic life."

This opinion of Dr. Down is exactly the opposite of my own. There are so many cases where the proof is incontestable that the idiocy is of congenital origin, and where the dental development is perfect, that if I were to draw any proof from the facts, I should say that the regularity of the dental organs showed conclusively that there had been no lesion or disturbance of the brain (in the true sense) after birth, and that the teeth grew regularly in accordance with physical laws under a low order of intellect.

These remarks, of course, do not apply to epileptics, nor to imbeciles who were bright in infancy, and from any cause, afterward, degenerated.

Let it be borne in mind that no irregularity in the position of the dental organs is any evidence of idiocy in the individual. The cases are so common where such deformities are found associated with the highest order of intelligence, that if I were to draw any inference from that condition in the abstract, I should say that it was more likely to indicate a precocity of mental development in the child, and very possibly a more brilliant intellect in the adult. At all events, it does conclusively prove a disturbed cerebral condition at some period in the child's history; or, if it is the result of hereditary taint, shows such a condition in the progenitors, which has originated from like causes, and, unless checked, will become intensified by transmission under similar surrounding conditions; and the future history of that family will be mental degeneracy.

An inherited taint, disturbance, lesion, predisposition, or tendency to idiocy, of which these irregularities are only a symptom or proof, may show itself in a precocious mental development in one instance, and be the precursor of insanity in the same individual, or appear as idiocy in posterity.

A résumé of my experience and observations shows the following results. In private practice I have seen a very large aggregate of dental deformity, and in most instances associated with an intellectual capacity above the average of mankind.

These abnormalities have not been confined to any prevailing type, but have included nearly every possible variety of irregular development. In the public schools, among the middle and lower classes of society, I have found but a small percentage of pronounced irregularity. Such as I have found was in nearly every case among the brightest children of the schools.

Among the children of good physique and fair mental capacity, the development was on the whole regular and normal; a noticeable fact being that the jaws were generally capacious and ample for the regularity of the teeth. In an occasional instance, there might be found a jaw of undue capacity and with separated and straggled teeth. One instance of this kind was particularly marked, and on making inquiry of the principal as to the status of the scholar, I was told that she was the dullest one in the school of over three hundred, and, although of an age to justify an entrance into the highest class, she could not rise above the lowest.

In the examination of idiots I have endeavored to separate those where the mental defect dated from birth, from those who in infancy showed the average mental capacity, and who from accident or disease afterward degenerated into imbeciles.

No more reliance is to be placed upon an examination of the jaws and teeth of the latter class, in a question of development, than upon an examination of the inmates of an insane asylum.

Confining myself to congenital idiocy, I found only a small percentage of pronounced irregularity in form of the jaws or arrangement of the teeth, and that generally associated with the lowest type of idiocy and the kind of which mental improvement was the most hopeless. Associated with deformities of the jaws were usually other abnormalities of physique showing a general constitutional disturbance.

Among the Cretins, capacious jaws were universal. Only among idiots drawn from the higher classes in Great Britain were there found exceptions.

My collection of evidence on this subject closes with another extract from Mr. Mummery's paper: "The Australian races exhibit in the configuration of the skull the lowest type of the human family. The cranium in these people is very narrow, the forehead low and receding, the teeth—especially the canines—project in a striking manner, and other irregularities were frequent.

"The physical character and habits of the Tasmanian race (now nearly extinct) so closely resemble the Australian, that I need only observe that in all points relating to disease, irregularity, etc., the defects of the Australian are exaggerated in the Tasmanian."

The deductions which I make from this array of facts, made up from all ranks and conditions of life, including races, nations, and classes,—ancient and modern,—from the highest order of intelligence down to the idiotic, are as follows:

A perfect dental development is the result of well-balanced physical and nervous systems, without hereditary taint.

The causes of irregularities I classify as developmental and accidental; the developmental operating prior to the eruption of the teeth, and the accidental subsequently.

Abnormalities of development having their origin in the same individual are due to a disturbance of the trigeminal nerve during the period in which the crowns of the permanent teeth are forming and arranging themselves in the jaw prior to eruption; or, when arising from causes antedating the life of the individual, are traceable to an inherited tendency, which tendency had its origin in a like disturbance in one of the progenitors, and was subsequently transmitted; or are the result of mixing different and distinctly-marked types of jaws and teeth by the progenitors.

In our view we do not call a feeble mind, a sluggish brain, or a dull intellect, a nerve lesion or a brain disturbance. For it is abundantly proven that when this condition is associated with an average physique, the development of the dental organs is tardy, but in regular order.

We have before us, then, both the solution of the problem and the evidence of most alarming symptoms in the physical and mental condition of the inhabitants of the centers of civilization.

There can be no question that the Creator intended there should be perfect harmony in the development of physical and nervous systems, and that where such harmony exists we come nearest to the standard of a perfect organization. This harmony of organization or true balance of the two systems demands that in the earlier years of life the brain and the nervous system be held in abeyance to the physical.

The healthier mental organization is of slower growth. If, therefore, we find that a certain mode of life destroys this harmony, breaks up this balance, there will follow necessarily deterioration and destruction of the race; and this is based on well-recognized physiological law; if the brain and the nervous system are in an undue state of activity, the drain upon the sources of nutrition will be at the expense of the physical system.

No force operating on the brain can interrupt or alter the type, or inherited model of the dental arch, after the first decade of life. All brain disturbances occurring during that period showing mental aberration, we should class under the general head of idiocy—imbecility. After that period, such manifestations come more properly under the head of lunacy,—insanity,—which might degenerate into imbecility or idiocy.

Consequently, neither lunacy nor insanity, in the ordinary acceptation of the terms, can have any direct bearing upon the development of the dental organs; but such a condition would be most potent of evil if transmitted to offspring.

I do not hesitate to place it upon record that the next generation will see more of abnormality in dental development, and an increase of nervous and cerebral diseases, and that the two are correlated and spring from the same cause.

It is too late to stop it in those who have passed infancy, but it is not too late to modify and partially remedy the evil in those now being born, and those who may be begotten hereafter.

To fathers and mothers surrounded by luxury and flattered with the precocity of their infants, which they are stimulating to the last degree, I say, You are the enemies of your race; you are sowing the seeds of nervous, mental, and physical disorders, from which the harvest will be fearful, and the end death to your family and your name. Do not, under peril, encourage this brilliancy of your child, which is now so charming; let the mind stagnate rather.

For the first seven years of life give concern *only* to his morals and to his physique. Nourish him as you would nourish an animal from which you desired the finest development, stimulating *only* his moral nature, and his intellect will take care of itself. Thus, if he have no hereditary taint, you will have laid the foundation of a splendid specimen of his race.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the Office of the Librarian of Congress at Washington.]

(Continued from page 118.)

Third. The only remedy to which I shall direct attention as *liable* to endanger the pulp is *chromic acid.*

This salt is made from a mixture of two parts of saturated solution of bichromate of potassa and three parts of sulphuric acid. When prepared it is in the form of "bright red crystals, which are very deliquescent, and easily decomposed into sesquioxide of chromium, *by contact with organic matter.*"

It is only occasionally that we meet with cases of sensitive dentine in which even deliquesced chloride of zinc seems to have no other effect than to produce a pain of greater or less intensity, without any subsequent diminution of sensibility. In such instances it is recommended to try *chromic acid.*

I have been surprised at the manner in which this application has been alluded to in various communications and text-books, and have only been satisfied as to the reason of this when I have learned that authors have merely followed the suggestions and statements of others, without having had any personal experience with this medicament.

For the same reason that I have indicated the *deliquesced* chloride of zinc, as the only accurate application of that salt, I would state that *chromic acid* should be employed in the same condition; but I wish it distinctly understood that *a degree of care is absolutely necessary in the use of this salt that can only be appreciated by actual experiment.*

Like the *ordinary* tincture of iodine (which, for dental purposes, should never be used in the mouth), it will be found that chromic acid "runs" in all directions.

For this reason especially it should not be applied in crystal form until a reasonable amount of experience has taught the inability to control it, and *then*, I think, it will not be so employed.

For this reason also the *rubber dam should not be used* to insure dryness, *although as complete dryness as is possible is of decided advantage;* but there is danger that the acid may filtrate at some point, and, coming in contact with gum and other tissue, may, unknown to the operator, produce extensive lesions, very hard to cure.

Some of the most troublesome and annoying cases that I have ever been called upon to treat, have been the results of carelessness or ignorance in the use of chromic acid,—troublesome, because of the extended destruction of the festoons of the gums and edges of the alveolar processes, together with tardiness of recuperative action; and annoying from the conviction that it was treatment for a needless infliction, the result of want of care or knowledge.

It is also imperative that constant supervision should be given to the progress of chromic acid; like nitric acid it should be watched closely, for, although sometimes somewhat painful, it is usually comparatively or entirely painless in its action; therefore, after a few seconds of direct exact application of *deliquesced chromic acid, made from the end of a probe,* it should be neutralized by a *dry* antacid, such as chalk or bicarbonate of soda, in small quantity; after which the possibility of excavating may be ascertained.

If satisfactory results are obtained, consecutive applications may be indulged in, but with increased caution, for it is rarely the case that any notable evidence of pulp irritation is given, until the dentine adjoining that organ is so much affected by the acid as to render it probable that sooner or later we may have cause to regret its use, from the presence of a devitalized pulp.

I have had cases in which, after chromic acid applications, the response to thermal and visual tests continued for nearly two years, gradually lessening, notwithstanding the treatment for soothing and saving pulps, and finally eventuating in death of the organs, where I could detect no other complication than an over-indulgence, upon my part, in the use of this agent for the purpose of obtunding otherwise intractably sensitive dentine.

It seems to me needful that I should additionally warn against the use of chromic acid in cavities near to or under the edge of the gum, and particularly when these cavities are in anywise inaccessible, for it is only with the greatest care that experienced manipulation can secure an entirely satisfactory result in these cases.

If, as the sequence of the use of chromic acid, a proper excavation has been made, the cavity and the surrounding parts should be thoroughly washed by frequent syringing with tepid water,—better if slightly alkalied by solution of ammonia,—and it is surprising how persistent the presence of the acid will be found, by the occasional wiping of the adjoining parts and crevices between teeth with bibulous paper or muslin,—indicated by the yellowish staining of whatever is employed.

As is the case with chloride of zinc, the prepared cavity should be dried and saturated with oil of cloves or carbolic acid and dried again prior to filling.

Fourth. Remedies Dangerous to the Pulp.— I shall refer to but one *varied* application under this head, viz.:

Arsenious Acid and Cobalt.—I speak of this agent in this connection not because I regard it as properly belonging here; not that I esteem it in any degree a remedy for the diseased condition under consideration, but because it has been used for this purpose for a period almost equaling in extent the years of practice claimed by the oldest members of our profession; because it is easy of application, and because it is, *most lamentably*, a notable obtunder of sensitive dentine.

I have thought that it would not be sufficient that I should *ignore* arsenious acid while writing upon this subject. I have thought that I should not feel as though I had done my duty by merely advising, in few words, against its limited employment, either in quantity or length of duration; I have thought that it would not be enough for me to discountenance its use, "in very small quantity, for not more than an hour," but I have desired to give it that prominence which shall make it impressive and positive when I say that *I advise against its use for this purpose entirely.* My conviction in this matter is, that after an arsenious application, no matter how small, nor of how limited duration; no matter how superficial the cavity, nor how dense the tooth-structure, no one can be answerable for the maintenance of vitality in the pulp of that tooth.

It is no argument that pulps are asserted to have lived for years after such application; for one of these we have hundreds upon hundreds which have died; it *may be* that such good results have sometimes ensued, but they must be regarded as anomalies, and we cannot base practice upon anomalous cases.

It is tolerably well known that I made the subject of arsenious acid, in its relations to dental practice, one of special study, experiment, and observation; and it was during the progress of this investigation that I became thoroughly impressed with the wonderful power for good and for harm which this agent possesses.

I desire, at this time, the more explicitly to oppose any employment of arsenious acid or cobalt for the obtunding of sensitive dentine, as it is also tolerably well known that I admit the possibility of long-continued applications of these potent medicines to pulps, *for the purpose of devitalization;* and as this fact is liable to produce misapprehension, I may be pardoned the desire for placing my record so clear as not possibly to be misunderstood.

Arsenious acid is a most subtle poison. It is most persistent in its action where it has once entered into tissue within which circulation, and consequently nutrition, more or less normal, is maintained.

It is only comparatively safe just in proportion as it acts as an *immediate devitalizer*, except under very peculiar anatomical considerations such as pertain to the dental pulp, which will be discussed in place.

When it is brought in contact with open-structured tissue, with broad connections, like skin, tumors, etc., it is the very intensity of the strength of the preparation used that insures its superficiality of effect.

The dentine is relatively so situated as regards the pulp. This organ is its origin of formation and its source of supply for nutrition; it is an open structure, with broad basal pulp connections, and therefore it is that, reasoning by analogy, it would seem that the very small amounts of arsenious acid which are enjoined as "safest," in reality, are most dangerous, and that to insure the greatest degree of security the strongest possible undiluted applications should be made.

But it should be considered that applications both strong and weak have been indulged in, and that all seem to be alike disastrous; and it should, therefore, be the rule of prudence *never* to use this agent in a tooth, unless devitalization of the pulp is the avowed purpose for its employment.

When we have reached that point in the treatment of sensitive dentine at which all other medicaments have failed, we have still remaining resources which seldom or never disappoint either operator or patient, that are far preferable to the dangerous expedient of applying arsenious acid.

The fourth division of this subject discusses those considerations in connection with sensitive dentine which associate with deep-seated caries.

DEEP-SEATED CARIES *is that stage of progress at which decay has produced a cavity of that depth which renders liable any irritation of the pulp during the course of preparation or filling, or as the result of the operation.*

At present it is my intention *briefly* to notice the action of the various medicaments which I have mentioned, when sensitiveness of dentine is found in connection with "deep-seated caries," as it will be necessary to *refer* to them when we have this class of cavities under thorough consideration.

Prepared chalk, bicarbonate of soda, oil of cloves, and even the *strong solution of ammonia,* carefully introduced, may be considered as entirely safe applications, while creasote and carbolic acid may be regarded as comparatively safe, being injurious only in idiosyncratic cases; but all the other applications which have been recommended for this purpose are quite dangerous when we have this complication to deal with. Chloride of zinc causes a degree of painful throbbing which precludes its use; chromic and nitric acid both act to a depth which would be most liable to endanger the pulp; and arsenious acid would not here be thought of even by those who occasionally use it in simple cavities of decay.

In cases, then, where we find the exigencies demand the use of the less dangerous of these latter remedies, we can so protect the pulp by gutta-percha or some one of the various stoppings which are largely composed of this material, as to almost certainly preclude the possibility of trouble.

It has been suggested to use gutta-percha dissolved in chloroform for this purpose, but my experience indicates as more reliable the use of some mixture of gutta-percha such as is employed for filling teeth.

The cavity should be as dry as possible, and, in order to prevent permeation of the irritant medicine, an *adhesive union* of the gutta-percha with the walls of the cavity nearest the pulp should be made; this is not so certain of accomplishment with solution as it is with mass; it is apparently easier, *but it is more possibly deceptive;* the dropped solution, or even when it is introduced upon a muslin vehicle, is liable to curl imperceptibly at the edges during the evaporation of the chloroform, and thus offer that opportunity for the commencement of permeation of irritant, which is soon announced by the pain we deprecate, or, worse still, by the later discovery that painlessly, but none the less hopelessly, our efforts have been thwarted.

On the contrary, if the gutta-percha protection is introduced after the manner of a filling, it is easy to see and feel that it is positively *adherent* to the wall of the cavity.

It is usually directed to warm the gutta-percha upon a porcelain over a spirit lamp, and if this is done very carefully, and with constant attention to temperature, it is all that is desirable; but gutta-percha heated to 212° is in excellent condition for manipulation, while if it is heated above melting, it can never be restored to its former toughness. It is therefore better to heat it on the cover of a metallic vessel containing water, by which means it is insured against attaining a deteriorating degree.

It is sometimes difficult to work gutta-percha satisfactorily in a *prepared* cavity; but it is even more difficult to do so in a cavity which has been but partially cleansed; this is due to stronger adhesion of the material to the instrument upon which it is introduced, or to the plugger with which it is condensed, than to the walls of the cavity.

The first difficulty is markedly obviated by taking the portions of the gutta-percha upon the point of a small probe for introduction, and the latter by touching the serrations of the plugger to a pad of oiled chamois skin.

(To be continued.)

A NEW OPERATION FOR THE RADICAL CURE OF EPULIS.

BY JOHN C. K. CROOKS, M.D., D.D.S., HONEOYE, NEW YORK.

Epulis is an exceedingly interesting disease to the dental surgeon. While it is sometimes a remarkably mild difficulty,—so mild and inoffensive that a person's tongue can remove it,*—it is again so obstinate and formidable that the ingenuity and nerve of the operator is taxed to the utmost to discover suitable means for its extirpation. Arising generally, if not invariably, from the same structure, the periosteum lining the alveolus, it would seem that it ought to assume more uniformity of character. Yet this is not the case. On the contrary, it puts on every conceivable phase; not only in degree, but in general appearance,—being at one time, or in one person, apparently a simple excrescence of the gums, preserving the color, hardness, vascularity, and sensitiveness of this tissue; while at another time it becomes a dark, irregular, fungoid growth, which can hardly be distinguished from fungus hematodes, and is in every respect a malignant disease. Neglected or tampered with, the mild may develop into the malignant form; hence the question when and how to operate becomes one of a good deal of consequence.

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* Fergusson's Surgery, page 511.

It has been my good fortune to have seen quite a number of cases of this peculiar form of tumor, and to have operated for its removal and radical cure; and, having had very good success, and my mode of procedure in a few cases having been somewhat unique in its character, I beg to relate the history of two of the latter cases, which will serve as fair illustrations of the manner in which I would invariably attack the disease when well developed and requiring active measures for its extirmination.

Mrs. S., aged thirty-five, when five months pregnant with her third child, discovered a small dark-colored tumor apparently growing down from the gums, between and posterior to the upper central incisors. As it gave her little annoyance at this time, it was decided not to molest it during her pregnancy; consequently it was not interfered with, and, much to her concern, proceeded to grow very rapidly, so that at the time of her confinement the incisors were separated fully one-half an inch at their lower extremity, and there was a tumor about the size of an almond occupying the space between and around their roots. As soon as she had recovered from the birth of her child, the tumor having progressed with great rapidity, attaining the size of a large walnut, I was called upon to operate, which I did in the following manner:

The incisors being widely separated and exceedingly loose, and there being not the least prospect of saving them, entertaining also the notion that the disease originated from the periosteum within the alveolus, I proceeded first to extract them, and then with a narrow saw, which I had extemporized for the purpose, I cut away the tumor—alveolar process and all—between the upper lateral incisors quite to the floor of the nares, thus making a deep concave section of the superior maxillary bones at their articulation with each other anteriorly. The operation was attended with a good deal of hemorrhage, which was successfully controlled in a brief period by compression, and, as the seat of the wound was where dressings could not well be applied, it was left entirely to the efforts of Nature, under whose care it healed kindly and rapidly. In six months, just when I began to indulge in a hope that my operation would prove a success, it began to return,—at first showing itself in a minute, purplish spot in the deepest portion of the concavity produced by the removal of the tumor. I waited until it had attained the size of a pea, giving unmistakable evidence of its disposition to return, when I attacked it again, but this time with caustic,—there being no opportunity to use the saw or bone-forceps, unless I went through into the nares, which I considered an unjustifiable procedure in consideration of the small size of the tumor, and it apparently being confined in its *point d'appui* to very narrow limits. As a caustic I selected arsenious acid in the form of "arsenical paste," saturating a small pledget of cotton; and, after puncturing the tumor, which was hard and leathery, down to the bone, placing it directly in contact with the latter,—the point from which the disease appeared to take its origin. After watching it a few moments and ascertaining that the elasticity of the parts kept the cotton firmly in position, I then gave instructions not to molest it in any way until the slough seemed ready to drop away, and awaited the result. In about a week or ten days the cauterized portion separated, bringing with it a thin spicula, or plate, of bone, the size of a gold dollar, which proved to be an end to the disease. Waiting a year for a return of my perplexing case, and seeing nothing more of it, I adjusted a plate supplying the lost teeth, and my patient looked quite as well as ever.

Six months after my last experience with Mrs. S., I had a call from another lady, who had a large, ugly-looking tumor, unmistakably an epulis, occupying the entire space between the first lower bicuspids, crowding and distorting the incisors and cuspidati in an unsightly way. Having already determined, if I ever had another case, to rely upon the caustic alone, I at once proceeded to reduce it to practice, modifying it, however, to the extent of cutting away the major part of the excrescence to avoid the offensiveness of so large a decaying and lifeless mass in such a locality. Removing the teeth, which could almost have been effected by the tongue of the patient, so loose were they, and, cutting away a large part of the tumor, I inserted a little pellet of cotton well saturated with arsenical paste into the extremity of each emptied alveolus. In two weeks my patient returned, and I easily and painlessly lifted away the bony slough or sequestrum, just enough and no more to effectually get rid of every particle of the disease. It is now over four years since this operation was performed, and there has been no return of the difficulty. From these two cases (not so satisfactory and conclusive as a larger number), I am quite convinced that not only the seat of the disease is in the periosteum, or plate of bone immediately beneath, but that any operation, like the one detailed, which will remove the diseased portion and no more is far better than a reckless waste of tissue, as must invariably occur in the use of the knife and saw, which consigns healthy and diseased, soft and hard, tissues alike to certain destruction,—a truly Herodian method of procedure. Finally, to any of the readers of the DENTAL COSMOS who may desire to try the above method for the removal of epulis, I beg to suggest this caution: *do not be lavish in the use of the caustic!* Arsenious acid is a powerful remedy, and a very little, a pellet of cotton the size of a mustard-seed saturated with the "paste," and placed *well down* in each affected alveolus, or securely anchored at any point from whence the disease may appear to originate, is *all-sufficient* to accomplish the purpose. But one important condition, however, is necessary when using so small a quantity of this or any other caustic,—it must be confined *in situ* by being *hermetically sealed there.* For this object any one of the several gum tinctures found of value in like cases will be quite effective.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST JUDICIAL DISTRICT DENTAL SOCIETY.

REPORTED BY F. M. ODELL, D.D.S.

AT the regular meeting of the First District Dental Society, held February 2d, 1875, Dr. Gibson read a paper on the "Diseases of the Lungs and Chest, and their Treatment." The doctor mentioned as a first and most important step in the treatment of such diseases, the breathing of a larger quantity of air ; this, in time, permanently enlarging the cavity of the chest, more perfectly decarbonizing the blood, and commencing the cure upon a firm basis.

Dr. John Allen followed, with some remarks in the same key, claiming for the hard tissues as fair a start in the liberal supply of the proper elements for the growth of teeth and bones, and demanding that the forty pounds per barrel of mineral matter now so carefully bolted from our flour and fed to the pigs, should be fed to our children, who are suffering for the lack of it.

Dr. J. G. Ambler read a paper in relation to the new degree of "M.D.S.," urging upon all the older practitioners in the State both the propriety and the necessity of their obtaining some such recognition of their professional standing.

Dr. Barrett, of Warsaw, President of the State Dental Society, argued that as the State had now recognized the dentists, the least return they ought to make is to qualify themselves to obtain its degree. He believed that the frequent assembling of the dentists was one of the best means of educating them as a class; it also acted as a stimulant to many to try to improve themselves. He understood the first aim of dental legislation to be organization, not prohibition. The peculiar diploma conferring its degree of M.D.S. was originated by the State Society with the idea of having an entirely new degree, which should not conflict with any of the old degrees already in use

Dr. A. P. Southwick, of Buffalo, New York, said that celluloid, being a vegetable substance, the same as rubber, requires much the same treatment as that substance does. In order to prevent shrinkage in his plates, he simply leaves them upon the original casts until cold ; or if a plate is already warped, he plunges it into water as hot as he can bear his hand in, and claps it into the mouth immediately; on the theory that the shrinkage is caused by the cooling of the plate from the vulcanizing point. Plates of celluloid should never be packed at a higher temperature than 270°; above that point they begin to bubble. Thinks celluloid as far ahead of rubber as rubber is ahead of paper.

Dr. Goble said that he has no trouble with plates shrinking; he packs his celluloid cases by simply heating in boiling water; they pack perfectly and do not smash the casts either; it of course requires more time and care, but the result is perfect work. The casts are so hard as to require cutting out with a knife or chisel.

GEORGIA STATE DENTAL SOCIETY.

The sixth annual meeting of this society convened in Atlanta the 11th, and adjourned the 14th, of May. Dr. A. C. Ford, of Atlanta, President, in the chair. Sixteen new members were added to the rolls.

The following papers were read: "Dental Histology and Physiology," by Dr. George Paterson, of Waynesboro'; "Dental Surgery," by Dr. E. Parsons, of Savannah; "Mechanical Dentistry," by Dr. J. L. Fogg, of Barnesville. Dr. J. A. Hart, of Hawkinsville, read a description of a case of surgery in his practice, and exhibited some rare specimens of abnormal growth of teeth.

The Executive Committee, chosen by the society under the law passed by the State Legislature to regulate the practice of dentistry in the State, reported a form and method of granting license, which the society approved.

Resolutions upon the deaths of Drs. Fogle, of Columbus (one of the oldest dentists in the State), and Campbell, of Atlanta, were read and spread upon the minutes.

Officers elected for the ensuing year:

President.—Dr. George Paterson, of Waynesboro'.

First Vice-President.—Dr. George W. McElhaney, of West Point.

Second Vice-President.—Dr. J. P. Holmes, of Macon.

Corresponding Secretary.—Dr. M. S. Jobson, of Perry.

Recording Secretary.—Dr. L. D Carpenter, of Atlanta.

Executive Committee.—Drs. E. Parsons, of Savannah; E. M. Allen, of Marietta; J. P. H. Brown, of Augusta; W. F. Tigner, of Columbus; and H. A. Lowrance, of Athens.

Committees to report at next meeting:

Histology and Physiology.— Drs. Charles C. Allen, of Marietta, and D. S. Wright, of Macon.

Pathology and Surgery.—Drs. J. P. H. Brown, of Augusta, and M. H. Thomas, of Monroe.

Chemistry and Therapeutics.—Drs. L. S. Ledbetter, of Cedartown, and E. Parsons, of Savannah.

Operative Dentistry.—Drs. A. C. Ford, of Atlanta, and M. S. Jobson, of Perry.

Mechanical Dentistry.—Drs. S. G. Holland, of Atlanta, and R. I. Hampton, of Rome.

Dental Education and Literature.—Drs. F. Y. Clark, of Savannah, and J. H. Coyle, of Thomasville.

Clinical Operators.—Drs. L. D. Carpenter, of Atlanta; R. W. Thornton, of Calhoun; J. W. Murrell, of Athens; and J. P. Holmes, of Macon.

Dr. G. F. S. Wright, of South Carolina, by request, exhibited the electrical burring engine and mallet.

Clinics were held by Drs. Wright, of South Carolina; Pool, of Columbus; and Ford, of Atlanta.

The next meeting will be held in Atlanta (as provided by the Constitution) on the second Monday in May next (10th), at ten o'clock A.M. All dentists in the State particularly invited to be present, and all from other States who are in good standing are cordially invited to attend.

THIRD DISTRICT DENTAL SOCIETY.

The annual meeting of the Third District Dental Society of New York was held January 19th, 1875, at Albany.

Semi-annual meeting to be held at Lansingburg, New York, on the second Tuesday in July, 1875.

The society elected the following officers for the ensuing year:

President.—Dr. S. P. Welsh.

Vice-President.—Dr. W. F. Winne.

Recording Secretary.—Dr. H. A. Hall.

Corresponding Secretary.—Dr. J. A. Perkins.

Treasurer.—Dr. L. C. Wheeler.

Board of Censors.—Dr. J. A. Perkins, E. J. Young, W. H. Hart.

Board of Ethics.—W. H. Van Vleck, H. H. Young, S. D. French.

Delegates to State Society for four years.—H. A. Hall, N. D. Ross.

To fill vacancy.—F. Le G. Ames.

Subjects discussed: "Treatment of Exposed Nerves," "Celluloid *vs.* Rubber."

Subjects for discussion at semi-annual meeting: "Treatment of Syphilitic Teeth;" "Cause and Treatment of Teeth Similarly Diseased."

H. A. HALL, *Rec. Sec'y.*

RESOLUTIONS RELATING TO THE DEATH OF G. G. BONNER.

The following resolutions were passed at a meeting of the students of the Philadelphia Dental College, held February 24th, 1875:

Whereas, We have learned with unfeigned regret of the death of our esteemed fellow-student, G. G. Bonner; and,

Whereas, By his gentlemanly deportment, zealous attention to study, and his unselfish consideration for others, he became endeared to all those who knew him; and while we bow in humble reverence to the mysterious workings of an All-wise Providence, still we deplore the sad event, and extend our heart-felt sympathy to his parents and friends in this their sad bereavement.

Resolved, That a copy of the foregoing be forwarded to the family of the deceased, and that a copy be inserted in the Dental Cosmos.

C. S. Jones, Pennsylvania; J. M. Durham, M.D., North Carolina; J. R. Owens, Iowa; W. W. Barnes, North Carolina; G. N. Snow, Connecticut; W. C. Longnecker, Pennsylvania, *Committee*.

The Faculty also passed resolutions expressive of their respect for his gentlemanly conduct, studious habits, regular attendance upon the lectures, and in the dispensary and laboratory of the College.

BALTIMORE COLLEGE OF DENTAL SURGERY.

The thirty-fifth annual commencement of the Baltimore College of Dental Surgery was held in the Concordia Opera House, Baltimore, on Thursday evening, February 25th, 1875.

An address was delivered by James Murphy King, of the graduating class; the valedictory by Prof. Thomas S. Latimer, M.D.

The number of matriculates for the session was forty-one.

The degree of D.D.S. was conferred on the following members of the graduating class by Prof. F. J. S. Gorgas, M.D., D.D.S.:

NAME.	RESIDENCE.	THESIS.
Reverdy Brook Beall	Maryland	Mechanical Dentistry.
Charles Campbell	Maryland	Decay of the Teeth.
John Ernest McBean Chevers	West Indies	Mechanical Dentistry.
Joel Beverly Coyle	Georgia	Diseases of the Teeth.
Erastus Clarence Eversole	Virginia	Artificial Teeth.
Charles Denny Hilliard Fort	Mississippi	Dentition.
James Orlando Hodgkin	Virginia	Dental Hygiene.
Hardy Miles Hunter	Texas	Dentarius.
James Murphy King	Tennessee	The Teeth.
Charles Luther Moore	Georgia	Dental Prosthesis.
Charles James Phillips	California	Artificial Dentures.
Samuel Dillard Rambo	Georgia	Anæsthetics.
George Bangheart Raub	New Jersey	Dental Caries.
Robert Edward Sparks	Canada	Nitrous Oxide Gas as an Anæsthetic for Dental Operations.
I. Hamilton Thomas	Virginia	Filling Teeth.
Edward Franklin Wayman	Texas	The Circulation.
Garner Brown White	South Carolina	Dental Caries.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The nineteenth annual commencement of the Pennsylvania College of Dental Surgery was held at the Academy of Music, Philadelphia, Thursday evening, February 25th, 1875, at eight o'clock P.M.

The address to the graduates was delivered by Prof. James Truman; the valedictory by T. L. Woolfolk, D.D.S.

The number of matriculates for the session was seventy-two.

The degree of D.D.S. was conferred upon the following members of the graduating class by Henry C. Carey, Esq.:

NAME.	RESIDENCE.	THESIS.
George R. Ball	Ohio	Diseases of the Antrum or Maxillary Sinus.
T. W. Buckingham, A. B.	Pennsylvania	Dental Necrosis.
Francisco P. Carbonell	Cuba	Caries.
Thomas S. Daniel	Georgia	Chloroform as an Anæsthetic.
Reuben B. Holder	Maine	Inflammation.
Robert A. Holliday	Georgia	The Rubber Dam.
Walter J. Higgins	Tennessee	Endodontitis.
John V. Hall	New Jersey	Extraction of Teeth.
Albert P. Johnstone	South Carolina	Alveolar Abscess.
Robert H. Jones	North Carolina	Dentition.
Willoughby L. Jacobs	Virginia	Neuralgia.
Hugh J. Linn	Pennsylvania	Vulcanite as an Artificial Denture.
L. Edwin Mellen	New Hampshire	Artificial Dentures.
Homer J. Patterson	Pennsylvania	Traumatic Tetanus.
Jose M'a Perez	Cuba	Salivary Calculus.
William G. Phelps	Delaware	Defective Nutrition.
William S. Richey	Illinois	Diseases of Antrum as relating to Dentistry.
George S. Slayton	Vermont	Causes of Diseases of the Teeth and General System.
George B. Scott	New York	Inflammation of Dental Pulp.
Edward M. Thompson	Pennsylvania	Extraction of Teeth.
Willis A. Trescott	New York	Teeth, their Origin and Development.
Robert T. Vandevort	Pennsylvania	Diseases of the Maxillary Sinus.
Thomas R. Warren, M.D	Kansas	Physiology of Repair.
Harry T. Wells	Missouri	Anæsthesia.
Cherrick Westbrook	Pennsylvania	Periostitis.
Thomas L. Woolfolk	Kentucky	Enamel.
Charles B. Wagner	Pennsylvania	Progress of Dentistry.

PHILADELPHIA DENTAL COLLEGE.

The twelfth annual commencement of the Philadelphia Dental College was held at the Academy of Music, Philadelphia, on Saturday, February 27th, 1875, at eight o'clock P.M.

The address to the graduates was delivered by Prof. Samuel B. Howell, M.D.; the valedictory by G. N. Snow, D.D.S.

The number of matriculates for the session was one hundred.

The degree of D.D.S. was conferred on the following members of the graduating class by Richard Newton, D.D., President of the Board of Trustees:

NAME.	RESIDENCE.	THESIS.
Frederick Arendt	Denmark	Diseases of the Cavum Oris.
John Quincy Adams	Illinois	Inflammatory Condition.
Aloys Bermann	Prussia	Development of the Human Teeth.
Joshua U. Burnett, M.D	New Brunswick	Dyspepsia the result of Defective Teeth.
William Fletcher Burns	Nova Scotia	Salivary Calculus.
Willis W. Barnes	North Carolina	Digestion.
Henry Chavannes	Switzerland	Alveolar Abscess.
Hamilton F. Cunningham	Ohio	Circulation of the Blood.
Eusebius C. Chandler	Ohio	The Teeth, their Functions and Importance.
Charles D. Carter	Massachusetts	Fifth Pair of Nerves.
J. S. Clark	Indiana	Dentition.
J. Walter Drake	Ohio	Odontalgia.
J. Henry Durham, M.D	North Carolina	The Blood.
John H. Drury	Washington, D. C.	Heat.
Simon Eschelmann	Canada	The Fifth Nerve.
J. Henry Follett	New York	Success.
Harvard Greeley	Maine	Anæsthesia.
Thomas Gardinier	California	Extraction of Wisdom Teeth.
W. Theo. Georgen, M.R.C.P	Canada	Odontalgia.
Charles S. Jones	Pennsylvania	Mechanical Dentistry.
D. Edward Kelley	Ohio	Dentistry and its Progress.
L. P. V. J. Kjaer	Denmark	Respiration, Vital Forces.
William B. Knapp	Indiana	Preservation of Exposed Pulps.
Frederic H. Lunt	Massachusetts	Treatment of Exposed Pulps.
Ridgway H. Lamb	New Jersey	Nutrition and Growth.
Joseph G. Marple	Pennsylvania	Dental Histology.
James Martin, A.B	Pennsylvania	The Dentist—His Specialty.
John Ralph Owens	Iowa	The Dental Pulp.
Thomas R. Pixton	England	Dental Metallurgy.
Jonas D. Peters	Pennsylvania	The Fifth Pair of Nerves.
William J. Potter	Pennsylvania	Development of the Deciduous Teeth.
J. Henry Redman	England	Influence of Diet, etc., on the Teeth.
Allan B. Robinson	New York	Anæsthesia for Dental Purposes.
Everard G. Reynolds	New Hampshire	Digestion.
Gustavus N. Snow	Connecticut	Caries—Cause and Prevention.
Henry C. Snyder	Pennsylvania	Metal Plate Work.
Mathew H. Snyder	Michigan	Dental Caries.
Homer A. Sampsell	Ohio	Inflammation.
Arthur Baxter Visick	England	Dentistry—Past and Present.
W. H. Williamson, M.B.C.M	Scotland	Diagnosis.
Edward C. Welch	New York	Caries.

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NEW YORK COLLEGE OF DENTISTRY.

The ninth annual commencement of the New York College of Dentistry was held at Association Hall, on Monday evening, March 1, 1875.

The address to the graduates was delivered by Professor Alexander W. Stein, M.D., the valedictory by Charles L. Dubar, D.D.S.

The number of matriculates for the session was seventy.

A written examination is required of graduates instead of a thesis. The faculty prize was awarded to Robert A. Fones, of Connecticut.

The degree of D.D.S. was conferred by Dr. S. A. Main upon the following named gentlemen :

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Manuel G. Angarica	Cuba.	Daniel E. Morse	New York.
Charles L. Dubar	France.	George Viall	Ohio.
Frank H. White	New York.	Wm. J. Hewes	Texas.
Louis S. Marsh	New Jersey.	George L. Lamson	New York.
Frank J. Mayer	New York.	J. Herbert Clark, M.D.	Canada.
T. Charles Tierney	New York.	Henry J. Cressinger	Ohio.
Wm. J. Branique	New York.	Robert A. Fones	Connecticut.
Wm. T. La Roche	New York.	Henry S. Gould	Massachusetts.

BOSTON DENTAL COLLEGE.

The seventh annual commencement of the Boston Dental College was held at Wesleyan Hall, Boston, on Tuesday, March 2d, 1875, at seven o'clock P.M.

Dissertations were read by George Cook Ainsworth, Robert Robbins Andrews, and William Coffin Starbuck. The valedictory was delivered by Horace Eliot Pope.

The number of matriculates for the session was twenty-four.

The degree of D.D.S. was conferred on the graduating class by Prof. Isaac J. Wetherbee, President.

NAME.	RESIDENCE.	THESIS.
George Cook Ainsworth[*]	Massachusetts	Preservation of the Teeth.
Robert Robbins Andrews	Massachusetts	Microscopical Structure of Human Dentine.
Frank Murry Celley	Vermont	Dental Education.
Charles Proctor Ensworth	Massachusetts	Periodontitis.
Charles Reuben Greeley	Massachusetts	Digestion.
James Homer Methot	Massachusetts	The Extraction of Teeth.
Charles Henry Osgood	Massachusetts	Orthodontia.
Horace Eliot Pope	California	Periodontitis.
Warren Porter	Massachusetts	Digestion.
William Coffin Starbuck	Massachusetts	Mucous Engorgement of Maxillary Sinus.
George Williams	England	Mechanical Dentistry.
Charles Goldsmith Watkins	Massachusetts	Teeth and their Care.
George Beckwith Watkins	Michigan	Impressions.
George Washington Weld[†]	New York	Odontalgia.

DENTAL DEPARTMENT OF HARVARD UNIVERSITY.

At a meeting of the corporation and overseers of Harvard University, at the close of the session of 1874–5, the university degree of "Dentariæ Medicinæ Doctor" was conferred upon the following graduates :

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[*] Will receive his Diploma September 1st, 1875.

[†] Out of Course.

NAME.	RESIDENCE.	THESIS.
F. G. Eddy	Rhode Island	Syphilitic Diseases of the Mouth.
J. W. Hazelton	Massachusetts	Salivary Calculus.
T. J. Morong	Massachusetts	Deposits on the Teeth.
W. B. Parker	Massachusetts	Comparative Anatomy of the Teeth.
E. F. Whitman	Massachusetts	Necrosis.

The class consisted of forty-two students.

MARYLAND DENTAL COLLEGE.

The second annual commencement of the Maryland Dental College was held in Masonic Temple, Baltimore, on Wednesday evening, March 3d, 1875.

The address was delivered by Rev. Thomas Guard.

The number of matriculates for the session was twenty-four.

The degree of D.D.S. was conferred upon the following graduates by C. S. Hurlbut, D.D.S., of Springfield, Massachusetts, one of the Regents:

NAME.	RESIDENCE.	THESIS.
Fred. F. Drew	Maryland	Continuous Gum.
Wm. H. Gingrich	Maryland	Circulation.
Wm. H. Law	Connecticut	Digestion.
Frank W. Shield	Virginia	The Mouth.

EDITORIAL.

We devote a large portion of our space in this issue to the presentation in full of the very interesting paper of Dr. N. W. Kingsley, read before the New York Odontological Society at the special meeting in December. We propose in the next number to publish a report of the discussion which followed the reading of this and some of the other papers. A synopsis of Dr. Kingsley's paper, which has appeared in two or three of the journals, has created a false impression in some quarters as to the views presented. We commend the paper to the thoughtful consideration of our readers.

CORRECTION.

Through an inadvertence, the heading of an article in the March number of the Dental Cosmos, on "Gold," by Dr. G. V. Black, located the author at Jerseyville, Illinois, instead of at Jacksonville.

PERISCOPE.

HAVE A SPECIALTY.—The sooner people begin to comprehend that practically there is no business, calling, trade, or profession which any one man can master in all its branches in a lifetime, the better will it be for every individual's prosperity. We believe that half the failures in the great struggle for livelihood are due to men trying to do too much, trying to fulfill all the requirements indicated by a name because their fathers did, but forgetting that, in their fathers' time, that name included an aggregate of labor of very different extent to that which it now encompasses. Every day as it closes leaves the world richer in knowledge, and the aggregation of many days produces a store of learning which increases vastly the quantity which the beginner must master ere he approaches proficiency. A couple of centuries ago all that the world knew of the healing art was within the easy grasp of any average intellect. Now, there is no physician living, however eminent, who pretends to have mastered or even to be moderately versed in all the details of medicine and surgery. So it is with science, with law, with mechanics, with journalism, until each calling has reduced itself to an agglomeration of specialties; and, without doubt each specialty in the future will be divided and subdivided as learning and education advance.

That which is true of the professions is equally true of the trades. The lawyers say that the man most to be dreaded as an adversary is "he of one book." The individual who knows only one thing, but that root and branch, is unquestionably abler and wiser than another who has dabbled in this and that until his mind is but a jumble of ill-assorted ideas, superficial at the best. If a mechanic, for example, finds that there is any one operation for which he has a special liking, and can accomplish it just a little better than anything else, that is the thing for him to stick to. He should make up his mind to cling to it through thick and thin, to try and improve certain parts until a uniform perfection is attained. It does not take the world very long to discover who is the best man for this or that purpose; and when it finds out that man, who has made a specialty of one operation and unquestionably does it better than anybody else, the world must avail itself of his labor and, in so doing, must pay him his own terms.

We do not mean to argue that a man should be like a horse, capable of entertaining but one idea at a time, for that would be to advocate narrow-mindedness; but we do mean to say that no man should be without one essential and prevailing object, in the prosecution of which he is determined to excel, and it does not make any difference what that is, whether cleaning a gutter or saving lives. We should liken this uppermost purpose in a man's brain to an elaborate treatise on one subject alone in a library of general encyclopædias. The last indicate the expansion and grasp of one's views on all things, the first their concentration on a life-work. The simile is all the more apt, for, after all, when we come to examine everything we know outside our one calling, we find we are only in possession of a more or less copious index. And we are led to the certain conclusion that the very best we can ever hope to do in the attainment of knowledge is to learn where this fact or that theory is to be found most readily when we wish to inform ourselves as to its signification. The wider a man's education, the bigger his index; and perhaps we may safely say that one of the cardinal differences between the educated and uneducated is that the former are capable of instantly selecting the proper means of refreshing their memory, while the latter might spend days in search of the same.

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All this adds weight to our first advice, namely, have a specialty, and push it. Be sure you are right before you select it. We do not believe that any man can rise to eminence in a calling which he dislikes, and herein lie the oft repeated mistakes of parents in forcing children into trades and professions against the latter's inclinations. A boy who has a feeling for art, who spends every moment with paint and brush, will chafe under coarse mechanical labor; while another whose delight is in his tool-chest will rebel against the slavery of books and brain-work. Both, when they become their own masters, will eventually abandon their distasteful tasks; and it is only a question of their continuity of purpose whether they become "rolling stones," drifting from one business into another all their days, or workers, firm and steadfast, because buoyed up by a constant sense of enjoyment of their chosen labors.

Intermittent toil is wasted effort: so also are attempts to manage two or three different pursuits at once. There must be one definite aim; and towards this every thought must be concentrated, for nothing is more certain than that fame, wealth, and happiness are the rewards of only those who

"Still advancing, still pursuing,
Learn to labor, and to wait."

—*Scientific American.*

The Leverage of the Lower Human Jaw.—(An excerpt from the author's note-book.) Data.—*Average Weight of each Single Tooth in Grains—Average Weight of all the Teeth in Grains—Weight of Lower Jaw in Grains, without the Teeth—Weight of Lower Jaw with its full Complement of Teeth in Grains—Centre of Gravity of Lower Jaw—Position of Fulcrum—Long Arm in Inches—Short Arm in Inches—Fulcrum of all the Teeth—Long Arm of each Tooth in Inches—Short Arm of each Tooth in Inches—Moment of each Tooth—Sum of Moments of all the Teeth.*

The Weight and Bulk of the Teeth are always in the same ratio.*—Owing to the equal density of all the teeth, their weight and bulk coincide; hence these terms are convertible, and are thus used in the following section. If the bulk of a lower incisor, for instance, which weighs ten grains, is equal to the one-fiftieth of a cubic inch, then the weight of an upper canine, the bulk of which is equal to the one-twenty-fifth of a cubic inch, will be twenty grains, and so on. In other words, if one tooth weigh twice as much as another, it will have twice the bulk.

Relative Size of the Teeth.—The largest teeth in the head are the upper molars (33.4 grs.), and the smallest are the lower incisors (10.8 grs.): an upper molar is about three times as large, therefore, as a lower incisor. From the lower incisors the teeth increase in magnitude in the following order:—A lower bicuspid (14 grs.) is bigger by about four grains than a lower incisor, and an upper bicuspid (16 grs.) exceeds a lower in size by about two grains. Next in order come the upper incisors (16.4 grs), which scarcely exceed in bulk the upper bicuspids. The lower canines stand next (17.9 grs.), being a little larger than the upper incisors. Then follow the upper canines (21.4 grs.), which are much bigger than the lower, and about twice the size of the lower incisors. In the remaining groups, the teeth are much larger: an upper wisdom (32 grs.) is about thrice the size of a lower incisor; the wisdom 31.9 grs.) is nearly the same in bulk. Finally, the largest teeth in the head are the molars.

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* For the loan of some thousands of teeth, in order to conduct these experiments, the author is indebted to Charles James Fox, Esq., Surgeon to the Dental Hospital, London, and to John Franks, Esq., surgeon, Sevenoaks, Kent.

Relative Size of the Teeth in the Upper and Lower Jaw.—The teeth in the upper jaw are larger than those in the lower. The weight of all the teeth in the upper jaw is 370 grs., that of those in the lower 330 grs., showing a difference of 40 grs.

The Difference between the Size of the Teeth in the Upper and Lower Jaw diminishes as they recede from the Front of the Mouth.—The mean difference of an upper as compared with a lower incisor is 5.6 grs.; of an upper canine to a lower, 3.5 grs.; of an upper bicuspid as compared with a lower, 1.4 gr.; and of an upper molar to a lower, 1 gr. The greatest difference is that between the six front teeth, the incisors and cuspids, in each jaw. The upper incisors and cuspids weigh exactly 108.4 grs.; the same teeth in the lower jaw, 79 grs.—difference, 29.4 grs.;—whereas the difference between the six upper and lower molars amounts to 2.1 grs. only. There must, of course, be a necessity for this disparity in bulk, else it would not have existed. Why should there be a difference in the upper and lower front teeth amounting to 29 grs., and a difference of 2 grs. only between a like number of teeth at the back of the head? Several reasons might be assigned, among which may be noticed that, as the front teeth in the upper jaw stand out most prominently in the face, they are most exposed to the effects of blows or other injuries, and require, therefore, great firmness as to their setting in the alveoli, which measure results in no small degree from their superior magnitude. In the next place, they have to bear the succussion from the lower teeth in the act of mastication, for in ascending through a much more considerable space than the back teeth—sweeping as they do through arcs of larger circles—they must of necessity accumulate velocity; and velocity and weight are equal to force.[*] In the third place, if the teeth in the lower jaw were as heavy as those in the upper, the muscular power required to elevate them in conjunction with the jaw itself would be greatly increased, and might prove altogether disproportionate to the demand. Now, as it has been proved by direct experiment that the teeth in the lower jaw are lighter in weight than those in the upper, and also that they increase in weight according as they recede towards the back of the jaw, one of the advantages—not to say necessities—for this twofold arrangement would appear to consist in the sensible diminution of stress upon the lever-power by which the lower jaw is moved; a stress or force which tells more, it must be remembered, inasmuch as, at the best, the use of this kind of lever is always attended with a certain loss or disadvantage. Now, the expenditure of power is, as will be shown, economized to a remarkable degree by the lighter weight of the teeth in the lower, as compared with those in the upper jaw, as well as by the lighter weight of the front teeth in the lower jaw itself, as compared with those which are situated behind. In order to make this apparent, it is necessary first to consider the leverage of the lower jaw itself, destitute of the teeth; next to show the additional power which is required to elevate it when supplied with its full complement of teeth; and then, by way of contrast, further to notice what additional loss of power would be sustained, or, in other words, what greater encroachment would be put on its muscular resources, supposing that the teeth in the lower jaw were all reversed in their position—the incisors being caused to occupy, for instance, the places of the molars, and *vice versâ:* or supposing, in the next place, that the lighter teeth in the lower jaw were replaced by the heavier ones of the upper. Of the two bones chiefly concerned in the mastication of food and articulation of speech, the upper bone remains almost entirely stationary or passive; whilst the lower bone, on the other hand, is almost incessantly in a state of motion. The provision consists in the fact of the lower jaw being so articulated with the bones of the head that it shall work about a hinge. This kind of motion requires that it shall have a muscular apparatus on purpose that it may be elevated or depressed, moved laterally, or caused to advance and retreat, according to its various exigencies: no similar provision being required for the upper jaw, which is immovable. As the lower jaw turns about a fixed point by the aid of a force acting upon a certain part of its shaft, the bone becomes in effect a lever-rod, of which that portion which is situated at the joint is called the "fulcrum," the bone itself the "rod," whilst the muscles which move it are the "power."

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[*] As the upper teeth are always in a state of quiescence, and the lower always in a state of motion, an incessant battery is kept up by the latter against the former. The question might be, Which is to succumb? but that is not the question,—it is this: How are both to maintain their stand-point for a long series of years, at the lapse of which neither shall have given way? This will become apparent when the angle at which the lower teeth impinge on the upper is considered, and from which it will be seen that the superior size of the upper teeth, and, by consequence, their firmer articulation in the jaw, were absolutely necessary to prevent their being fairly beaten forwards by the impact of those belonging to the lower jaw.

TABLE I.—*Bulk or Volume of the Teeth.*

Name.	Mean weight in grains.	Bulk or relation to cubic inch.
Lower incisor	10.8	0.020, or $\frac{1}{50}$
Lower bicuspid	14.6	0.027, or $\frac{1}{37}$
Upper bicuspid	16.0	0.030, or $\frac{1}{33}$
Upper incisor	16.4	0.031, or $\frac{1}{32}$
Lower canine	17.9	0.034, or $\frac{1}{29}$
Upper canine	21.4	0.040, or $\frac{1}{25}$
Lower wisdom	31.93	0.060, or $\frac{1}{16}$
Upper wisdom	32.0	0.060, or $\frac{1}{16}$
Lower molar	32.4	0.061, or $\frac{1}{16}$
Upper molar	33.4	0.063, or $\frac{1}{15}$

In the above table it was not sufficiently important to carry the calculations beyond three decimal places; hence the bulk of two teeth slightly differing in their mean weight comes out the same.

TABLE II.—*Mean Weight of all the Teeth from the Lightest to the Heaviest, from* 844 *Experiments.*

Number weighed.	Lower incisor.	Lower bicuspid.	Upper bicuspid.	Upper incisor.	Lower canine.	Upper canine.	Lower wisdom.	Upper wisdom.	Lower molar.	Upper molar.
139	10.8									
56	....	14.6								
115	....	....	16.0							
108	....	....	....	16.4						
112	....	....	....	....	17.9					
37	....	....	....	....	....	21.4				
32	....	....	....	....	....	....	31.9			
28	....	....	....	....	....	....	....	32.0		
110	....	....	....	....	....	....	....	....	32.4	
107	....	....	....	....	....	....	....	....	....	33.4
844										

In order to find the true leverage of the lower jaw, it must be considered from two distinct and different aspects. The first is that which relates to its anatomy, the second to its mechanism. Under the former are comprised its general configuration, weight, weight of the teeth, and exact line of concentration of the muscular power required to elevate it. The latter embraces the mechanical principles by which it is moved, and in which are involved the kind of lever used, the length of its rod, the position of its fulcrum, the center of gravity, the point of power. From these data the amount of force required to lift it is calculated. To this must be added the additional force expended in enabling it to perform its proper functions of mastication, articulation of speech, etc. The study of the leverage of this bone in this way becomes at once attractive and instructive, involving as it must do a minute acquaintance with its anatomical details, comprising the weight of the teeth as well as a knowledge of the mechanical powers which are exerted in setting it in motion.

On mapping out the lower jaw into regions for the purpose of converting it into a lever-rod of the third kind, there will be found in this bone several peculiarities not belonging to other bones in the body which are moved by the same kind of lever-force. First, the bone is bent at its anatomical angles. Now, as a bend in a lever goes for nothing, ideal lines must be drawn about in order to procure a straight rod from which to calculate the lever-powers. Secondly, the muscular apparatus by which it is raised is not concentrated in a given point on the bone, as in the case of the biceps muscle of the arm, but is spread over a space comprised between the coronoid process and the ascending ramus. The point of power, therefore, which must be somewhere or in some line which defines the concentrated effort of both muscles (temporal and masseters), has to be determined, otherwise the length of the short arm of the lever could not be discovered. Thirdly, the muscles act on the limbs with what is called a mechanical disadvantage. But it must be observed that mechanism has always in view one or other of these two purposes—either to move a great weight slowly, and through a small space; or to move a light weight rapidly through a considerable sweep. Now, while the latter of these two movements is that which the occasions of animal life principally call for—as in the case of the arm, where extent of motion is required rather than the ability to lift a heavy load, —in the mechanism of the lower jaw to overcome resistance was the chief end required; and accordingly the muscular fibres constituting the power are found to pass perpendicularly downwards from the sides of the head to the lower jaw-bone, and acting on it in a straight line. The force with which the power acts in this case is immense, particularly when the resistance to be overcome is placed near the fulcrum or directly beneath the action of the muscle. Advantage is taken of this circumstance in cracking nuts by putting them to a certain distance back between the jaws. Fourthly, while the resistance or weight to be overcome consists essentially in the substances which are used for aliment, and which may be exceedingly hard or tough, yet, besides this, there is the absolute weight of the jaw itself, amounting to nearly one thousand grains, the power to raise which has therefore to be determined. In this case the bone is the weight, and the point or position of that weight from the fulcrum, in order to determine the long arm of the lever, is the center of gravity of the bone itself; and this is found by actual experiment. Fifthly, having found the power required to raise the lower jaw-bone by itself, the next question is to determine the additional leverage which would be required, supposing that it is supplied with its full complement of teeth. There is here a very pretty and curious bit of mechanism in connection with the teeth of the lower jaw, any explanation of which, however, could not have been attempted unless the weight of the teeth had been previously ascertained, but which, nevertheless, is essential to the proper understanding of the leverage of the jaw. It results from the fact that while every tooth has its own specific weight, it has also a different distance from its fulcrum. It is obvious, therefore, that there are as many distinct ideal lever-rods as there are teeth, and each requires a separate calculation in order to find the lever-power to lift it. It is in effect like suspending a number of different weights in a row along a lever-rod, taking the power to raise each of them in succession, and then the sum of all the powers collectively to raise them altogether. Sixthly and lastly, the mechanical disadvantage of this kind of lever is partly compensated for in the very weight of the teeth themselves; and to this the attention of the reader has been already directed—for, as the teeth in the lower jaw are much lighter than those in the upper, and lighter moreover in front than behind, such an arrangement puts less stress on the power at that very part of the bone, considered as a lever, where the power acts with the least advantage. The utility of this is rendered still more apparent by contrasting the effect which would be produced by reversing the order of the teeth in the lower jaw from before to behind; or, again, by exchanging those in the lower jaw for those in the upper. In either case, a much greater demand, amounting to several hundred grains, would be made on the power.—*John Gorham, M.R.C.S., in Medical Times and Gazette.*

(To be continued.)

HEMORRHAGIC DIATHESIS.—Reviewing some notes of the following case, I thought they might not be uninteresting to your readers:

On Tuesday, July 23d, 1872, I extracted the wisdom-tooth from the left side of the lower jaw of A. M. Bryson, a lawyer of this city. Mr.

B. is an American, about thirty years of age, of full habit, weighing one hundred and sixty pounds, and perfectly healthy.

At the time I extracted the tooth, he informed me he came near bleeding to death from extraction of the tooth in front of it. The first molar had been previously drawn without special hemorrhage. At the time the second was extracted, having bled about three weeks, in defiance of the best medical aid at command, and until nearly exhausted, he stopped the hemorrhage by holding the finger firmly pressed into the cavity, about twelve hours, with the upper teeth shut hard upon it.

I had a vivid recollection of having treated him for epistaxis, in which I succeeded in checking the hemorrhage with full doses of tinct. ferri mur. internally, after having failed with other remedies.

I also remembered having barely saved the life of his little daughter, aged three years, in the winter of 1869 and 1870, from profuse uterine hemorrhage. She had three successive attacks, at intervals of about four weeks each, ushered in with the usual accompaniments of puberty. This little girl had chicken-pox during the time, and the pustules filled with blood almost as soon as raised. In this case, as in the father's, the tinct. ferri mur. succeeded after other remedies failed.

Mr. B. informed me that he had a brother who had bled severely from the kidneys and bowels for more than a year, occasioned by jumping from a horse.

Although aware of these facts, and admitting the possible danger, I fearlessly extracted the tooth, not entertaining a doubt but I could readily stop the bleeding, should it occur.

The gum appeared healthy, and the tooth came easily; nor did ten drops of blood follow its extraction. After remaining in the office about half an hour, greatly rejoiced at the success, as he had suffered some time from the tooth, fearing to have it drawn, he left for home, free from pain or indications of bleeding.

After about one hour, without premonition, the blood burst forth with great violence. Continuing to bleed profusely, he returned to my office, as I had directed. I filled the cavity with ferri persulph., which at once checked the hemorrhage, and he returned home more pleased, if possible, than at first, both believing the trouble ended.

He went about his usual business that day, and slept well that night. Early next morning the blood again gushed forth. The iron was again used, with perfect success for about ten hours, when the bleeding again burst forth. The cavity was repeatedly plugged, and the iron continued, with slight variation, until Saturday, each period of success shortening, until plugging, compression, and astringents in every form, appeared to lose control of the hemorrhage.

Every known remedy, both external and internal, was tried without avail. After having been checked a short time, the blood would pour out as violently as at the first. It began to ooze from the gums as from a sponge, and by Tuesday evening, in defiance of astringents and tonics, aided by the most nutritious diet, the face began to assume a cadaverous expression; the extremities became cold, and the outlook was about as cheerless as one could well desire. The sufferer had not lain down for a week, and the indication that "tired nature" was about ready to yield the contest was painfully apparent, all the physicians in the place generously aiding in the watchful care, both day and night.

At this stage we used nutmeg, browned like coffee, the panacea of a soldier, and with most astonishing success. The bleeding stopped, as by magic, for about six hours, when out it burst again, as fresh as at first. We repeated this remedy some four or five times, at each time with shortening intervals, until its power was gone. A strong solution of collodion, with all the tannic acid it would hold, succeeded for a number of hours once, but for once only.

A free use of kino in the cavity and about the gums, with my finger pressed as firmly upon it, for a number of hours, as the patient could bear, partially checked the hemorrhage; yet a combination of kino, catechu, and tannin appeared to increase the bleeding.

After Tuesday we so far controlled the hemorrhage, that on the whole we made blood faster than the sufferer lost it, thus passing the danger, though by no means relieving the care or anxiety.

Here was a case in which the "sure cure" of "the oldest and wisest inhabitant" failed, "the vanity of earthly wisdom."

The actual cautery was not tried, as it had signally failed in his previous case. The most vigorous application of arg. nit., used at the earnest request of an able physician, increased the trouble.

After thirteen days of doubtful struggle, we finally succeeded with the same remedy which had repeatedly failed us, a plug of persulphate of iron, yet not until the patient had bled at least eight quarts. In a medical journey of about twenty-five years I thought I had traveled over as hard spots as I would be likely to meet, yet can earnestly say, give me a repetition of any of them rather than another job like this.—*S. B. Chase, M.D., in Medical and Surgical Reporter.*

Phosphorus-Necrosis of Upper Maxilla.—H. M., aged twenty-nine, was admitted, October 28th, 1874, with necrosis of the upper jaw. He was a match-dipper by profession, having been so employed since eleven years of age. His health has been moderately good until one year ago, when he suffered from a cough, with considerable debility, followed soon afterwards by toothache in the right upper jaw. Three months since, he had a tooth extracted which was much decayed, the dentist, according to his account, tearing away at the time a portion of the gum. During the next month three more teeth were removed at various intervals. Marked relief always followed these extractions, the patient returning to work the next day.

On admission, the right side of the face was much swollen and sensitive; all the teeth on that side were loose, up to the middle incisor, the gums being very boggy, swollen, painful, and perforated in many places, through which pus exuded in large quantities, while along the jaw dead bone was readily felt. The man had a full beard and moustache of considerable length, thus disproving the assertion that this appendage is a protection against the fumes of phosphorus. The patient was very anæmic, with a temperature of 97°. Lacto-phosphate of lime, and cod-liver oil, were ordered.

At the clinic, October 31st, Dr. Morton removed all the necrosed portion of the jaw, the loosened teeth being first extracted; an incision was then made along the upper portion of the gum and roof of the mouth on the right side, and the bone separated front and back with the cutting-forceps. But little hemorrhage followed.

Dr. Morton exhibited to the class a patient who had suffered from severe phosphorus-necrosis some years ago, contracted in the same manufactory as the former case; Dr. Hunt, in 1866, removed rather more than the entire half of the lower maxillary on the right side without making an external incision.

The supplemental jaw, which in 1867 was quite as large as the normal one, has since undergone great absorption, being one-third less than formerly; otherwise the patient has enjoyed perfect health, and has been ever since engaged in his former business as "match-dipper." —*Penna. Hospital Reports, in Phila. Med. Times.*

HYPERTROPHY OF MUCOUS MEMBRANE OF MOUTH.—Mr. Braine showed (through the kindness of Dr. Waller Lewis) one of the employés at the General Post-Office, who had a large hypertrophied fold of the mucous membrane on each side of the frænum coming from the upper lip. When the lip was drawn tightly over the teeth, the growth slipped from behind it and entirely covered the upper teeth. The man was about eighteen years of age. He said that the growth commenced about six years ago. There was no family history of any like growth. Mr. Napier had noticed in some cases that, when certain teeth were absent, the edges of the other teeth irritated the soft parts, and a similar growth was the result. Dr. Fayrer had seen something similar in the scrotum. It had also been described by Dr. Vandyke Carter, and shown to be an affection of the lymphatics. Mr. Sewill had seen the affection generally in scrofulous patients.—*Reports Medical Society of London, in British Medical Journal.*

OSTEOMA OF THE SUPERIOR MAXILLA.—Mr. Butlin also exhibited a specimen of osteoma of the superior maxilla, the whole of which bone along the growth had been removed by operation from a man of thirty-nine. The man, an agricultural laborer, had been struck on the face with a bottle at the age of eighteen years; and ever since the accident there had been local swelling. When first seen the patient presented the signs of an outgrowth from the right superior maxilla. Last August a large abscess was opened below the orbit. In September the entire bone was removed; there was a good recovery. The growth proved to be composed of ordinary compact tissue as in exostoses. The case was of interest from its duration of twenty-one years, while the pain was not great.

Mr. Christopher Heath said that the tumor was so hard and so close to the alveolus that there might be a dental element in it. Having learned from Mr. Butlin that the lower part had not yet been examined, Mr. Heath added that this portion might be a conglomerate mass of tooth-tissue, called an odontome. Such a growth could easily be removed by shelling out. The induration around might be the result of irritation.—*Proceedings Pathological Society, in Medical Times and Gazette.*

RACHITIC CAT.—Dr. Edes exhibited the skull, scapulæ, humeri, pelvis, and femora of a cat. A large tumor arose from the upper jaw on each side, apparently from the alveolar process posterior to the canine teeth, involving the molars. The angles of the lower jaw were enlarged, softened, and hollow. The skull was much thickened and softened, the vault of the cranium having at least three times its normal thickness, but could be indented with the finger-nail. The scapulæ were of four or five times their normal thickness, and of spongy consistency. The humeri, pelvis, and femora were in a similar conditon, although not quite so striking in appearance as the shoulder-blades. The femora fractured easily just below the trochanters. The microscope showed only rarefaction of tissue without abnormal elements. The body was well nourished, and there was no disease of the internal organs.

The cat from which the specimens came had fed ravenously upon meat from an early age, and when first observed would not touch milk, although it afterward took a moderate quantity. It was noticed to be averse to jumping down, although it would climb quite well; it ran up-stairs, but came down carefully; it sometimes appeared in pain from being handled. It was put to death on account of the appearance of the tumors and the difficulty occasioned by them in eating. The precise period of their origin is not known.

The case is interesting in connection with experiments which have been made upon the production of rachitis by premature weaning, and other variations from a normal diet in growing animals. M. Guerin* is said to have rendered young dogs rachitic by substituting raw meat for their mother's milk. M. Tupier, however, from whose paper the above statement is borrowed, did not succeed with young cats; and he concludes that diet alone is unable to cause an abnormal progress of ossification.

The bones exhibited cannot be regarded as strictly rachitic, inasmuch as there is no trace of an over-formation of cartilage or bone; they are rather to be referred to a condition like the osteomalacia of the human race, which is, however, chiefly a disease of adult life.—*Proceedings of the Boston Society for Medical Observation, in Boston Med. and Surgical Journal.*

HINTS AND QUERIES.

Will some gentleman of large experience inform me if there is any peculiar risk in giving nitrous oxide gas to pregnant women?—A. B.

Is there any dentist in the United States using "Flexible Lined Rubber Plates?" If so, will he please state his experience?—O. T. O.

How can a young dentist of average ability, and several years' experience,—determined that every operation leaving his hands shall be as near perfect as he can make it,—best secure a good practice in the city?—U.

About one year ago I extracted a superior central incisor for a lady patient, about thirty-five years of age, on account of its being very loose, and pressure upon the surrounding gum causing the discharge of a considerable quantity of pus around the tooth. The patient now returns with the other superior central and three inferior incisors in the same condition. I am desirous of preventing the loss of these teeth, and ask advice as to the best course to be pursued.—W. G. B.

Reply to H. H. B., who asks how to soften plaster after coming out of the celluloid press.—Let him oil the inside of the flask before making the mould, then he can knock off the flask from the hard moulds after pressing, by using a hammer or wooden mallet.—J. W. KEYES, D.M.D.

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* Archives de Physiologie, January, 1874, p. 108.

REPLY TO H. H. B., who asks how to soften the plaster in celluloid work after the case comes out of the press.—I do not wish the plaster to be softened. I give the model a coat of liquid silex, before pressing, and when opened the plaster model comes out readily, either whole or in pieces. A few blows with a wooden mallet on the plaster opposite the plate crumbles the plaster to pieces, leaving the plate ready for the file without even washing.—H. F. DOUGLASS, *Fenton*, *Mich.*

CORRECTION.—Please state that the report in the January DENTAL COSMOS, under the head of "The First District Society," of a dentist in Warsaw, who had made twelve hundred sets of teeth on celluloid, was a mistake as to place, said mistake to be shared by Mr.—— in the dental depot, who said to me "from Warsaw, I believe;" and myself, who said at this meeting, "from Warsaw, I believe," and the reporter, who didn't say "I believe."

It certainly was not Dr. Barrett. He was a soldier, with all his trappings on, just come from practice at Creedmoor.—O. A. JARVIS.

CAUTION.—A correspondent suggests that dentists considering the establishment of business connections with operators in San Francisco, might possibly save themselves disappointment and loss by inquiring as to the qualifications and character of the parties with whom it is proposed to associate, and commends as reliable authority the officers of the San Francisco Dental Association:

President.—Dr. H. E. Knox, 23 Post Street.
Vice-President.—Dr. Wm. Dutch, 26 Montgomery Street.
Treasurer.—Dr. J. J. Birge, 410 Kearny Street.
Secretary.—Dr. Alexander Warner, 313 Kearny Street.

FILLING ROOTS WITH OS-ARTIFICIEL.—In filling the roots of teeth with os-artificiel, I have found the following plan to succeed to perfection. After having the teeth in condition, I take a piece of glass tubing, drawing the point to any size desired by means of my spirit lamp, and using it as a syringe, first having cut a small stick to be used as a piston-rod. Mix the os-artificiel thin, and take up the necessary quantity in the tube by means of the rubber cap that accompanies the ordinary drop-tube. The material may be allowed to become stiff enough to force out of the point at any degree desired. Then by inserting the point of the tube well in the opening of the fang the material can be forced well up, filling every part of the canal to perfection.—EDWARD NELSON, D.D.S., *Frederick*, *Maryland.*

DISEASES OF THE ENAMEL.—I noticed in the February number of the DENTAL COSMOS an article copied from the *Missouri Dental Journal*, written by Dr. Henry S Chase, entitled "Diseases of the Enamel," in which he says, "Spontaneous abrasion, denudation, can only be fully explained by a *theory* which covers the ground which I have gone over, namely, that vital action plays an important part in all pathological conditions of the dentine and enamel."

If that be a *fact*, what can we say was the *cause* of some human teeth that were used as a dental substitute? which was observed by Dr. E. Parmly to be attacked with *this* disease. Was this "vital action" or the lack of "vital action?" It *would* seem to be the last. Of course in *all* diseases, vital action has its work to perform. But in abrasion (chemical) the *chemical action seems* to have a *little* the most *power*, so that its action is *very gradual*, and we see the result.—C. R. TAYLOR, *Sandwich*, *Illinois.*

New Use of Solution of Celluloid.—Having accidentally cut my finger the other day in the laboratory, it occurred to me to apply a "*solution of celluloid in ether to which ten per cent. of alcohol had been added*," and which I had been using to replace a broken block on a set of celluloid. I was surprised at the result; the solution gently flowed over the wound, made one of the most perfect, elastic dressings, keeping the edges of the wound gently together, and acting as a styptic at the same time. I have been in the habit of using "gold-beater's skin" for a similar purpose when meeting with similar accidents, but this is far more perfect,—and one has but to try it to acknowledge its effectiveness, being impervious to water, and elastic,—or non-elastic as you use it thin or thick. I can see in the hands of the surgeon its adaptability to many grave cases,—while for trivial accidents it seems almost perfection itself.—C. De M., *St. Paul, Minn.*

The First Dental School on the European Continent was opened at Vienna on the 14th of December last, under the modest name of "*First Dental School of Vienna.*" The course is divided into a preliminary one of four weeks, and a regular one of six months. Students and doctors of medicine will be admitted to the lectures, and doctors only to the laboratory. The fee is three hundred florins (one hundred and forty-four dollars gold) and fifteen florins additional for the lectures.

The school does not confer any degree; the government gives the title of Magister of Dentistry.

The teachers (they do not call themselves professors) are: Joseph Seng, Doctor of Medicine and Surgery, M.D.S. (Magister of Dental Surgery); Ernest Alexovits, M.D , M.D.S., D.D.S. (of Pennsylvania College of Dental Surgery); M. A. Scheff, M.D.S., Doctor of Medicine and Surgery, Lecturer at the University of Vienna; Karl Thausig, M.D.S.

Since nobody in Germany is admitted to any study in any university unless he has passed an examination in classics, etc., they will not have any illiterate members in the profession.

Such dentists in Germany as cannot pass the examination required for matriculation may be admitted to extra lectures held for non-medical students, when they can prove an education fit for the second highest class of a high school (Gymnasium or Realschule), and then, after an examination, receive the title "Heilgehuelfe," Assistant of Minor Surgery. Some of those that cannot do the one nor the other come to America, and become Doctors of Dental Surgery at once. Returning to Germany, they have to pass an examination in some countries before being allowed to practice.

Dr. med. Bruck, jun., announces that he reads at the University of Breslau this winter,—1. Anatomy and Physiology of Teeth; 2. Pathology and Therapia of Teeth; 3. Holds Dental Clinics.

An Unusual Occurrence.—On the second of January, a gentleman of about thirty years of age, of strong constitution, and in good health, called on me to have a right inferior (dens sapientiæ) extracted. The patient's teeth were exceedingly large and well formed. It required considerable force to break up the attachments. The tooth had two large, well-formed roots. Almost immediately after the extraction that side of the face became paralyzed; the patient saying it felt as though it were frozen. The absence of sensibility is most complete at the anterior mental foramen.

Nearly eight weeks have elapsed since the extraction, and there is no improvement. What was the cause, and what can I do?—E. A. C.

In making up the points of a case such as described by your correspondent, one is compelled to consider the condition from that foundational aspect which exposes the subject at large. The case presented by E. A. C. is certainly a most interesting one; as interesting as it is rare, and is suggestive of a premise upon which the oral surgeon may with much benefit exercise his learning and diagnostic powers.

Palsy or paralysis, in its primary expression, exhibits a state in which muscular substance ceases its action. That a muscle has ceased to act is a fact which, when existing, expresses itself. In such direction of diagnosis the most superficial observer may not find himself at fault.

That, however, which concerns the surgeon in any of these cases to which his attention may be directed, is the matter of cause. Why is a part paralyzed? Why, as in this particular case that we here consider, have the facial muscles ceased to act?

A muscle ceases to act, either, as in instance of inflammatory exudations, because of mechanical obstruction or from the absence of a required nerve stimulus. The former expression of action is explainable in the swollen, hardened, and engorged condition of a part. The latter is associated with its nerve relation, and is to have a cause discovered not unfrequently alone through that knowledge which is able to read and comprehend the mysteries of the system at large.

In the case of a local paralysis, as for example this in the practice of your correspondent, inquiry is justly first to be directed to a consideration of local conditions. A facial paralysis implies loss of function in the portia dura. We seek naturally explanation of such loss of function. A lesion exists. Where is it? Is the condition one immediate or mediate to the nerve? Is the expression one of direct or indirect relation? What should the simple pulling of a tooth have to do with destroying or interfering with the function of a distant nerve?

If, in a local consideration of the case under observation, no lesion is to be discovered in the facial nerve from its point of entrance on the neck at the stylomastoid foramen to its peripheral terminations in the muscular substances of the cheek; if no lesion of the mastoid process of the os temporis exhibits itself, and no signs direct to any fault of the petrous portion of the bone, then it becomes a fair inference that no direct lesion of the nerve is present.

Satisfied with such a conclusion, a second step in the exploration carries us naturally to the locality of the supposable lesion; namely, the seat of the extracted tooth. The indirect relationship of nerves to each other finds the best expose in the condition known as neuralgia. From such point of reflex action or relation it is that we are to pursue this aspect of the diagnosis. The seat of lesion is supplied by a branch of the fifth pair, familiar as the inferior maxillary; this nerve, entering the bone at the posterior dental foramen, passes in a canal beneath the apices of the teeth, associates itself by means of filaments with each separate tooth, passing at length to the structure of the lower lip through the hole or opening known as the foramen mente. .

In referring now to the communication of your correspondent, we find, using his own words, "the absence of sensibility to be most complete at the anterior mental foramen." And in recalling the anatomy of the nerve we have to do with, we find this dental division which emerges at this foramen to be a branch of the posterior of the two portions into which the third of the trigeminus separates at the otic ganglion. Considering here the physiology of the nerve, we discover that into this branch enter not only filaments of sensation, but as well those of motion; hence, recognizing injury done to the nerve at the seat of extraction of the tooth, we find explained both loss of sensation and paralysis of the region of the lower lip.

As concerns a more extensive palsy, involving, for example, the cheek, explanation exists in local peripheral shock as reflected to the branches of the facial through the disturbance of harmony at the lower lip; or it is to be found in the relationship of communication existing at the otic ganglion; branches of connection between the nerve involved in the lesion and the facial existing through the mutual relationship of the two with the lesser petrosal.*

Upon such a showing, the case of your correspondent is to be understood, therefore, as having its origin in injury done to the inferior dental nerve; that sooner or later the muscles involved will recover both sensibility and motive power is scarcely to be doubted.

To expedite a cure and to guard against an atrophy into which unused muscles quickly fall, it is desirable that local stimulation be resorted to at once, and that such means be used vigorously. We would recommend, first, that cold and hot douches be thrown in immediate succession against the face, and this followed by a good shampooing with the camphorated soap liniment. Veratria ointment is highly praised by high authority. Galvanism is credited with many remarkable cures; one pole is to be placed over the parotid gland, the other successively at the supra-orbital, the infra-orbital, and the mental foramina. The use of heated metal is also highly commended. The face of a hammer, for example, may be heated in the flame of a spirit lamp and run over the tracks of the filaments several times a day. Blistering as a means of cure finds many advocates. In short, it is the employment of stimulation that is the principle, and this means may be used in any manner that suggests itself to the intelligence of the practitioner. If electricity, however, be employed, it is to be remembered that the current is to be run from without inward and not from within outward.

As encouragement to the patient of your correspondent, should his cure be tardy, we might recall the fact that in two different instances has Dr. Garretson, in operations on the parotid gland, cut from the necessity of his cases the facial nerve; yet in both instances, remarkable as it may appear, has fair motion in the face been recovered.

As a further and necessary study in cases of this character, attention is to be directed to secondary or associate lesions or conditions. These frequent causes of facial paralysis are to be found in the constitutional veins, as for example, rheumatism, gout, scrofula, malaria, syphilis, etc., conditions which, in every individual instance, are to be inquired into.

In considering a case of local paralysis, any existing functional derangement is to have its share of attention; paralysis from ascarides, from rectal accumulations, from hepatic or renal disturbances, from uterine displacements in the female; these are all familiar to the experienced practitioner.

It is important that local facial paralysis lead not to a mistake which shall overlook an advancing hemiplegia, and thus cheat the surgeon of time on which the life of the patient may depend. Also is it important that growing permanent lesions, structural change at the nerve center for example, or a growing exostosis on the line of the osseous relation of the nerve, be not confounded with simple local causes, as in such cases the use of stimulant applications serves only to goad a part already overburthened.—E.

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* See Garretson's "System of Oral Surgery."

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

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(Continued from page 200.)

I CANNOT dismiss the discussion of topical medicinal applications for the relief of sensitiveness of dentine, without referring to the fact that numerous remedies have, from time to time, been suggested as valuable.

Of these, I may instance tannic acid, tincture of aconite, chloroform, camphor, solutions of sulphate and acetate of morphia, solution of sulphate of atropia, ethereal solution of the terchloride of gold (objectionable from its easy decomposition), sulphuric acid, nitrate of silver (solution, crystal and fused, a time-honored application worthy of consideration, but objectionable on account of its depth of action and its discoloration of dentine, to obviate which the removal of the darkened dentine is probably the safest suggestion), thymol, *saturated* solution of iodine(?), etc., etc., etc.

I have experimented with these separately, and in various proposed combinations, until I have sufficiently satisfied myself that I cannot recommend them.

But, again, it is sometimes found that the most potent applications which have been deemed worthy of discussion are not sufficient to meet the requirements satisfactorily; indeed, in some instances they fail most ignobly,—seeming to be of not the slightest utility.

When these rare cases present themselves, if immediate completion of operation is not important, I use the *chloride of zinc* in mixture with the calcined white oxide of zinc.

Of these so-called "oxychloride of zinc" preparations there are a variety, any one of which seems sufficiently well adapted to meet the indications for the use suggested.

It is very universally recognized that these compounds are *utterly unreliable as permanent fillings*, although it is admitted that some fillings of almost every variety have been known to last for years; but for the purpose of obtunding sensitive dentine it is usually unnecessary that they should remain in the cavity for more than a week or two, or, at most, a month or two, during which time they can be seen occasionally, and the proper filling be opportunely introduced.

When chloride of zinc is used for this purpose, in this manner, it is usual to expect pain as the result of the application.

As was stated when upon the subject of chloride of zinc, the pain, whether more or less, should be *steady*, and by no means should *throbbing* be allowed to continue, should it supervene. The length of duration, however, of even the steady pain is very different from that mentioned in connection with the ordinary application of deliquesced chloride of zinc. Instead of the few minutes' continuance, it is *usual* for the pain to be very decided for many minutes, or for half an hour, and then begin gradually to subside. It is not unusual for *moderate pain* to continue longer than this, even much longer, for I have known it, in extreme cases, to have a duration of from five to nine hours.

I have never yet had any evidence that pulps have sympathized seriously with this infliction; neither do I recall an instance in which devitalization of the pulp has ever occurred, or has been necessary subsequently, from any cause, in any of these teeth.

The invariable rule is that teeth which require this treatment for the obtunding of sensitive dentine are extremely good and extremely dense; the cavities are always those of simple caries, and oftentimes almost superficial, being merely crevices, and sometimes only *points* in sulci, inappreciable to the eye.

These crevices and points are, however, most notably appreciable to the patient, giving rise to great discomfort, and frequently intolerable pain during mastication, and oftentimes causing ophthalmic, facial, and other neuralgic complications.

For the relief of all this, as has been previously stated, it is sometimes necessary to excavate crevice after crevice, until all the locations of trouble have been entered.

Thorough excavating, in these cases, is sometimes absolutely unendurable with any or all of the various medicinal applications for sensitive dentine; nothing more is practicable than the mere chisel breaking of the edges of the sulci,—and it is in such cases that the "oxychloride of zinc" temporary fillings will sometimes serve us most acceptably.

But sometimes this non-amenability to applications is concomitant with pressing need for permanent operations,—such, for instance, as distant residence of patients, with limited time for operating, immediate departure of patients for extended tours, etc.; and thus it has been found necessary to devise means which shall enable us to utilize remedies through the aid of apparatus.

By general acceptation, the members of our profession have seemed to recognize four kinds of application as comprising the list of *local anæsthetics.*

Equally by common consent, the positive condition of *heat* (exceeding rapidity of motion) has come to be regarded as one; the negative condition of *cold* (comparative slowness of motion) is another; the third is *dynamic electricity* in the form of "induction current;" the fourth is a variety of *drug applications*, either as single medicament or compounded, to be used upon the gums about the sensitive tooth.

It must be observed that the various topical remedies which have been discussed in connection with sensitive dentine can in no wise be regarded as anæsthetic, for their action is either that of attempting the simple reduction of hyperæsthesia to a condition of normal sensibility, or of causing *devitalization* of certain portions of dental tissue.

The first three of these local anæsthetics have each a claim to notice, but the fourth (drug application) has not, in my experience, proved of any positive value.

It is true that, from the many selected, chloroform and strong tincture of aconite have sometimes produced partially satisfactory results; but I have always noticed with chloroform such signs of general anæsthesia as made me ascribe to that condition the diminution of sensation due to its employment; and with dental tincture of aconite I have always produced a most unpleasant degree of persistent local anæsthesia, which seemed the inevitable sequence of any application sufficient to accomplish the *desired* object.

1. *Heat.*—Although, at this time, I but occasionally resort to the use of heat as an obtunder of sensitive dentine, it is by no means on account of its impotence. Even in the crude manner of quickly applying highly heated "ball burnishers," it is sometimes reasonably effective, particularly in cases of trouble in front teeth arising from either attrition or atrophy; but, with the galvanic cautery, a *rapid though deliberate* passing of the looped wire across the sensitive spots upon the worn or atrophied articulating faces of bicuspids and molars will often produce an immunity from suffering of quite gratifying length of duration.

It is, however, necessary that a somewhat powerful quantity-battery (several large cells) should be employed for this purpose, and the necessity for its use being very infrequent, I have heretofore naturally regarded this remedy as of relatively little value.

Now that galvanic electricity is being accepted as one of our dental "motors," it is but reasonable to infer that a sufficient number of practitioners will possess *quantity-batteries*, to render it imperative that I should direct attention to their possible utilization, as the promptest of all continuously effective obtunders of sensitiveness of dentine. It should be remembered, also, that while the scope of its employment is unquestionably exceedingly limited, it seems sometimes to meet the indications in certain cases where nothing else will give relief. These are analogous to those in which nitric acid has been mentioned as useful, and in which that application was accredited with the making of cavities in the accomplishment of its work as an obtunder.

It is in such instances that it will be well to try first the power of the galvanic cautery, from the fact that, if it proves successful, no further treatment will for the time be needed; though the cases should be watched carefully for a few months, that the effect upon the superficially carbonized tissue may be noticed.

The instrument for dental galvanic cauterization is one of rather more delicacy of construction than is usually employed for cautery purposes in other directions, though, of course, the mechanism is essentially the same.

Mine was made by Mr. Otto Flemming, Mechanical Electrician, of Philadelphia, to whom I feel indebted for much practical information, and many valuable hints during my experimentation in view of adapting galvano-electricity to certain requirements in dental therapeutics.

I use for wire heating the battery for an electric mallet.

II. *Cold.*—The subject of the induction of local anæsthesia by frigorific mixtures, or by the spraying of sulphuric ether, rhigolene, or other volatile, upon the part to be rendered insensate, is one which has, most deservedly, received such attention during the past few years, that remarks concerning mere manipulation or apparatus would seem unnecessary.

It has been sufficiently proven that excellent results are attainable when these agents are applied with that good judgment which is directed by thoughtful, perceptive experience; and it is unquestionably due to the want of this that failures, instead of successes, have led to such very partial adoption of this valuable therapeutic agent.

There is probably no application, even in dentistry, which has to be used with greater caution, than that of intense cold to a *sensitive* tooth.

With the utmost care and deliberation, the most excruciating agony is sometimes apparently unavoidable, and it is only with this marked attention that the application is ever tolerable.

Needless infliction is frequently the concomitant of the congealing process, both during induction and restoration, when employed for the purpose of obtunding pain during extraction of the teeth; but it is by no means always so *needless* when pain is induced from the attempt to obtund the sensitiveness of dentine.

When, however, this is satisfactorily accomplished, so complete is the result that I can only caution against excess of excavation as probably the direction in which consists the greatest danger.

It must be constantly borne in mind that all power for response is taken from the pulp, and that it may, therefore, easily be much too nearly approached without giving the slightest note of warning.

III. *Dynamic Electricity.*—There is no remedy for the relief of seemingly unconquerable sensitiveness of dentine, which affords me greater pleasure to discuss, than that form of dynamic electricity which is technically known as the *induction current.*

It is with this that I have achieved some of my most satisfactory results; it is with this that I have been enabled to overcome apparent impossibilities in the direction of comfortably preparing cavities in teeth which had, again and again, defied all alleviating efforts, both at my own hands and at the hands of many others.

It is with this that I have been able to endure the thorough excavation of cavities in my own teeth, than which I have never seen any more sensitive, and upon which all ordinary remedies are utterly useless.

Thus it is that I may be pardoned for speaking earnestly of that which I know *of my own knowing.*

I have also that especial interest in this matter which is begotten of personality; for, like the subject of arsenious acid, this has been with me one of long-continued and systematic investigation, experiment, and practical application.

It is now some fifteen years or more since I was placed upon a committee for the purpose of testing the merits of electricity, as offered for mitigating the pain incident to the operation of extraction.

The report of that committee, rendered some months later, was adverse to the use of this agent for the purpose, the statistical tables showing that *considerably more than half* of the many extractions were unsatisfactorily painful.

It was, however, found that about one-third of the operations were performed with comparative comfort, while some were absolutely painless.

It was this fact which led me to take up the subject of electricity as a local anæsthetic.

(To be continued.)

DENTAL EDUCATION.

BY ROBERT ARTHUR, M.D., BALTIMORE, MARYLAND.

No. 1.

The present and prospective condition of the dental profession is a subject, to those who feel a true interest in its welfare, of deep concern.

No question can be considered of greater importance, in this connection, than that of the education of those who seek admission into its ranks. This subject has recently been a prominent topic of discussion in a number of associations, both local and general. I propose, in view of the general interest displayed in this subject, to examine carefully the system of dental education as it now exists in this country.

An account of the organization of the first dental college, with which the present system of dental education originated, will be a fitting introduction to the consideration of the whole subject.

The first movement toward some concert of action among the more competent men engaged in the practice of dentistry, in this country, was made in 1839. Up to that time there had been no intercourse, or very little, among the small number of men who had struggled, under great difficulties, into such a knowledge of dentistry as enabled them to render good service in their calling. The objects of this movement were to furnish to honorable and competent dentists a medium of personal intercourse, for the exchange of views upon professional subjects, to draw a clear line of distinction between worthy men and impostors, and to establish some standard by means of which the public might be able to recognize this distinction.

This resulted in the formation of the American Dental Association. Simultaneously, the *American Dental Journal* was established, and published for a time under the auspices of the American Association. The beneficial influence exerted by these two agencies can be fully estimated by those only who were cognizant of the great necessity which, at the time of their establishment, existed for a movement of this character. To the leading men of that day great credit is due for their successful efforts toward liberalizing a pursuit which had previously been extremely exclusive.

About the same time, application was made to the legislature of Maryland for a charter for the "Baltimore College of Dental Surgery." The establishment of this institution, the first of its kind, was due to the energetic efforts of Dr. Chapin A. Harris.

The motives of Dr. Harris and his associates in this undertaking are set forth in Dr. Harris's introductory lecture, delivered on the occasion of the opening of the college, in the year 1840. Of the state of dentistry at this time, Dr. Harris says,—

"No credential or evidence of competency having been looked for or required, the profession has become crowded with individuals ignorant alike of its theory and practice; and hence its character for respectability and usefulness has suffered in public estimation, and a reproach been brought upon it which it would not otherwise have deserved.

"The community is at present unable to discriminate between the well-educated and skillful practitioner and the merest pretender,—and until it shall be able to do this, more or less of the reproach that is brought upon the pursuit by the latter will be visited upon the former.

"Accessible as has been the calling of the dentist to all that were disposed to engage in it, and that, too, without regard to qualification, it has been resorted to by the ignorant and illiterate, and, I am sorry to say, in too many instances, by unprincipled individuals, until it now numbers in the United States about twelve hundred, and of which I think it may be safely asserted that not more than one-sixth possess any just claims to a correct or thorough knowledge of the pursuit. That, under such circumstances, it should occupy a place in the world's estimation inferior to that to which it would otherwise be entitled, is not a subject of wonder."

"Dentistry" he characterizes as "a most useful and valuable department of medicine;" as a "branch of surgery."

"Of the qualifications necessary to be possessed by a dental practitioner, and the time required for their acquisition, few seem to be aware. On this subject an erroneous opinion seems pretty generally to prevail. A little mechanical tact or dexterity is thought by some to be all that is requisite to a practitioner of dental surgery, and that this could be obtained in, at most, a few weeks. The prevalence of this belief has given countenance to the assumption of the profession by individuals totally disqualified to take upon themselves the exercise of its complicated and difficult duties. But it is to be hoped that the day is not remote when it will be required of those to whom this department of surgery shall be intrusted to be educated men, and well instructed in its theoretical and practical principles. Elevate the standard of the qualifications of the dental surgeon to a level with those of the medical practitioner, and the results of his practice will be always beneficial, which at present are frequently the reverse. Require of the practitioner of dental surgery to be educated in the collateral sciences of anatomy and physiology, surgery, pathology, and therapeutics, and the sphere of his usefulness and his respectability will be increased."

With these views the faculty entered upon their work, with earnest promises of faithfulness to the important trust they had assumed. "Aware," said Professor H., "of the responsibility that rests upon them, the faculty will spare no efforts to make it creditable to the State that created it, and beneficial to the public. Conscious that its claims to respectability and usefulness will depend upon the manner in which they shall discharge their duties, it will be their constant endeavor to impart not only correct, but thorough, theoretical and practical information; persuaded that without this it is impossible for any to practice the art with credit to themselves, or for the benefit of their employers, they are resolved to admit none to the honors of the institution except such as possess it. In short, they are determined that no reproach shall rest upon them for fixing a standard of qualification that shall not at once be respectable, and entitle those coming up to it to the confidence of an enlightened community."

The new school was regarded with general favor, and enlisted the interest and best wishes of the most prominent men engaged in our calling. To have retained this favor and to have run a most successful and useful career, lay within the power of those who controlled it. That the confidence at first reposed in it became greatly impaired within a few years after its establishment, was a subject of deep regret to its friends, who deplored a lost opportunity of greatly advancing the best interests of dental surgery.

The faculty of this school originally consisted of four professors. The subjects taught were: Anatomy, Special Pathology and Therapeutics, Principles of Dental Surgery, and Operative and Mechanical Dentistry. Subsequently, a chair of Chemistry was added. Besides the professors, there were, after the school came into full operation, three demonstrators: one each of Anatomy, Operative, and Mechanical Dentistry.

The professor of special pathology and therapeutics undertook to teach some of the general principles of medicine, as having an immediate bearing upon dental surgery. The substance of these lectures was embodied in a work published in 1852, under the title of "Dental Medicine." Dr. Thomas E. Bond, Jr., the incumbent of this chair, was fully capable of his task, and, if he had had a sufficient incentive to induce him to devote to it the labor requisite to the object, could, and probably would, have expanded it. It is my impression, however, that the lectures were in substance and extent the same at about the end of a long career as at its commencement. Well written as this work is, and clear and admirable as far as it goes, it is but a meager presentation of this important feature of dental education; but nearly as much as a lecturer could accomplish in one short course.

As I have intimated, this feature of the "Baltimore Dental College" was never expanded; it disappeared from the curriculum on the death of Dr. Bond. The terms of graduation were very similar to those of the schools of the present day.

There is one fact connected with the organization of this school known to but few persons. It was not originally contemplated by Dr. Harris that the degree of D.D.S. should be conferred. He was persuaded to introduce this feature by a friend, the Rev. John N. McJilton, now of New York, from whom, some years after the establishment of the college, I received this information.

The next school was the "Ohio Dental College," which was established in 1845. I have not at hand one of its earlier announcements, but my impression is that the curriculum did not vary materially from that of the Baltimore College.

In this school there are six professorships. The duties of the respective chairs embrace—Anatomy, Physiology, Pathology and Therapeutics, Dental Hygiene and Microscopy, Chemistry, and Clinical Dentistry. In addition to the regular faculty, there is a Demonstrator of Mechanical Dentistry, and one of Anatomy.

The terms of graduation are as follows:

"A candidate for graduation must have had two full years of pupilage, part of which, at least, should be with a reputable dental practitioner, inclusive of two complete courses of lectures in a dental college.

"A graduate of a respectable medical college, who has had one year's pupilage under a reputable dentist, or a student having a regular pupilage, and having passed a satisfactory examination upon anatomy, elementary chemistry, and mechanical dentistry, may be admitted to an examination for the degree of D.D.S., after attending one full course of lectures. Such preliminary examination shall not relieve the student from attendance on the lectures and quiz on these branches, nor from a final examination upon them. He must possess a good moral character. He will be required to present to and defend before the faculty a written thesis on some subject pertaining to dental science. He must also deposit in the college cabinet an artificial denture of his own workmanship, made in the college, which must be satisfactory to the faculty. Sufficient evidence of the required pupilage or period of practice will be required."

In 1850, the Philadelphia College of Dental Surgery (not the school now bearing that name) was established. Its faculty consisted of five professors and two demonstrators. The curriculum was the same substantially as that of the Baltimore College, except that the chair of Special Pathology and Therapeutics was merged into that of "Principles of Dental Surgery." Some difficulty in the faculty and with the Board of Trustees, who insisted on their right to confer honorary degrees independently of the faculty, led to the abandonment of the enterprise after a successful career of six years. The same faculty, with one exception, applied for and obtained a charter for a school to be called the "Pennsylvania College of Dental Surgery."

The present faculty of this institution comprises six professors and two demonstrators. The subjects taught are Chemistry, Mechanical Dentistry and Metallurgy, Dental Pathology and Therapeutics, Dental Histology and Operative Dentistry, Physiology and Microscopic Anatomy, and Anatomy and Surgery. The qualifications for graduation are as follows:

"The candidate must be twenty-one years of age. He must have studied under a private preceptor at least two years, including his course of instruction at the college. Attendance on two full courses of lectures at the *regular or winter* sessions in this institution will be required, but satisfactory evidence of having attended one full course in any respectable dental or medical school will be considered equivalent to the first course of lectures in this college. Also, satisfactory evidence of having been in practice five years, inclusive of the term of pupilage, will be considered equivalent to the first course of lectures."

The present Philadelphia College was established in 1863. The faculty consists at present of five professors and two demonstrators. The subjects taught are stated to be Physiology, Anatomy, Surgery, Mechanical Dentistry and Metallurgy, Chemistry and Materia Medica, Operative Dentistry and Dental Pathology. The qualifications for graduation are as follows:

"The candidate must be of good moral character, and not less than twenty-one years of age. He must have had two years' private tuition, and attended two full winter courses of lectures in a respectable dental or medical college, one of which shall have been in this institution; but certified evidence of having had five years' practice in dentistry, inclusive of pupilage, will be regarded as equivalent to one course of lectures."

Both the colleges last referred to have, beside the regular faculty, a certain number of what are termed "Clinical Lecturers." These are practitioners of dentistry, who operate before the classes.

Both of these colleges have recently established a spring and fall course of instruction, attendance upon which is regarded as equivalent to private pupilage.

The Philadelphia school gives notice that, after February 28th, 1877, five years' practice will not be considered as an equivalent of one course of lectures.

In 1867, Harvard University, recognizing the importance of dentistry, added a dental to its other schools. A separate building, in close vicinity to the hospitals and medical school, is appropriated to technical instruction in dentistry. It is provided with all the accommodation and appliances necessary for this purpose. Instruction in Anatomy, Physiology, and Chemistry is given in the medical school, to which the dental students have access for the purpose.

The lectures attended by the dental students at the medical school are those of the regular medical course. The lectures on strictly dental subjects are given in the dental school.

The faculty of this school consists of five professors, the subjects of whose chairs are stated in the announcement to be as follows:

Mechanical Dentistry, Anatomy, Surgery, Dental Pathology and Therapeutics, and Operative Dentistry. There are four assistant and adjunct professorships, viz., of Operative Dentistry (two), Physiology, and Chemistry. Beside these, there are a Demonstrator of Practical Anatomy, an Instructor in Dental Therapeutics, an Instructor in Dental Pathology; two Lecturers, one on Dental Therapeutics and Pathology, one on Operative Dentistry; and two Demonstrators, styled Demonstrator in Charge and Demonstrator of Mechanical Dentistry.

In all, there are some sixteen connected with the school as teachers.

The daily order of exercises for the winter term of 1875–76 gives the time devoted to each of the subjects embraced in the curriculum· The winter course continues nineteen weeks.

The Professor of Mechanical Dentistry lectures once on Monday of each week, at nine o'clock.

The Professor of Dental Pathology and Therapeutics lectures once on Tuesday of each week at nine o'clock, and on Thursday every other week at ten and a half o'clock.

The Assistant Professor of Physiology lectures three times each week, and hears recitations every Saturday.

The Professor of Surgery once.

The Professor of Anatomy occupies five days in lecturing and hearing recitations. Instruction in the dental laboratory is given at nine o'clock, from one to two hours, although the time occupied is not definitely stated.

From two to four o'clock, five days in the week, is occupied with instruction in the Infirmary, and at four o'clock a lecture or clinic on Operative Dentistry, on some days, is given.

To Chemistry are devoted one lecture and one recitation during the week.

The qualifications for graduation do not, at present, differ from those of other dental schools, except in requiring three years' study under competent instructors. But from and after 1876 an important change is proposed, to which I will hereafter direct particular attention.

The New Orleans dental school issues (1874–75) its eighth annual announcement.

It has seven professors, who teach the following subjects:

"Theory and Practice of Dentistry, Institutes of Medicine and Dentistry and Special Therapeutics, Science of Dental Mechanism, Chemistry, Operative Dental Surgery, Clinical Dentistry and Dental Materia Medica, Anatomy and Physiology."

Conditions for graduation,—extract from by-laws of the college:

"Candidates for graduation shall bear good moral characters, and attained the age of twenty-one years, and shall have attended at least two full courses of lectures, the last one of which shall have been in this institution, exclusive of the usual two years' office pupilage. Graduates in medicine or dentists of five years' respectable actual practice, independent of pupilage, will be considered equivalent to a first course in this School,—satisfactory evidence of such being produced, in order to entitle them to this privilege." (*Sic.*)

The New York College of Dentistry was established in 1865. The faculty comprises six professorships. The subjects are Regional Anatomy and General Pathology, Operative Dentistry and Oral Surgery, Histology, Visceral Anatomy and Physiology, Chemistry, Materia Medica, Therapeutics, and Mechanical Dentistry. There are two demonstrators and two assistant professors. In addition, there are ten consulting dentists and clinical lecturers.

The requisites for graduation are similar to those of the other schools referred to, with some differences. Private pupilage is not required. Five years' practice, inclusive of pupilage, is considered equivalent to one course. "Dentists, who have been in the study and practice of dentistry for ten years, shall be entitled to the degree of D.D.S. on passing the required examinations of the college, and paying for one course."

Another feature is peculiar to this college,—it is this: "Tickets for separate departments may be taken at twenty-five dollars each, after paying the matriculation fee of five dollars."

I have thus presented an outline of the present system of dental education in this country. I will hereafter examine it more closely.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

This society held a special meeting December 14th, 15th, and 16th, 1874. By arrangement, the usual routine business was omitted, and the sessions were devoted to the reading of papers and the discussion of professional and scientific matters.

The committee had issued invitations to some two hundred gentlemen, of whom about one hundred and fifty responded.

The president, Dr. A. L. Northrop, called the meeting to order, extending, on behalf of the society, a cordial welcome to the invited guests, and explaining the objects of the gathering in the words of the first article of the constitution of the society, viz.: "To promote the highest excellence in the science and art of dentistry; the cultivation of closer professional relations, and the securing a higher appreciation of the aims of the dental profession."

The death of two of the invited guests was announced, viz.: Dr. Eleazar Parmly and Dr. Asa Hill; and a committee was appointed to draft resolutions expressing the sense of the meeting in relation thereto.

Dr. W. G. A. Bonwill, of Philadelphia, read a paper upon "The Electro-Magnetic Mallet, Rubber Disks, etc."

This was followed by the reading of a paper by Dr. Louis Jack, of Philadelphia, upon "The Electro-Magnetic Mallet."

These papers showed originality and research; but a synopsis would fail to do justice to them.

Tuesday morning the secretary read a paper by S. P. Cutler, M.D., D.D.S., of Memphis, Tennessee, entitled "Amalgam Experiments." The author had made and described in detail the results of various experiments with silver, tin, platinum, brass, copper, gold, nickel, cadmium, etc., with a view to ascertain what metals, and in what proportion, make the best alloy.

The following extracts show his conclusions:

"Filings of platinum and mercury rubbed together in the palm of the hand do not amalgamate readily, not even if moistened with alcohol; they do not form a metallic mass at all, but remain in the form of a dark powder. There appears to be no affinity between the two.

"I combined platinum with silver and tin in small proportion, and found that just in proportion to the amount of platinum was the amalgamation retarded, and just in proportion to the variation of the relative amount of platinum to the other ingredients, was the process of amalgamation varied. So long as there was any platinum present, so long was the process retarded.

"The next experiment was with platinum and gold, one equivalent of platinum and two of gold; amalgamation was very slow, requiring considerable rubbing. After the lapse of two weeks, it was not firm, but was easily picked to pieces with the finger-nail; in fact, it did not harden to any extent."

* * * * * * * *

"Copper filings, rubbed with mercury, do not easily amalgamate; moistening with alcohol facilitates the process; it makes a white mass, but does not harden at all.

"Brass filings, after considerable rubbing, amalgamate slowly, but quicker than copper, owing to the zinc in the brass. This specimen did not harden in the least.

"Nickel does not unite with mercury after long rubbing, hence could be of no use in amalgams.

"Cadmium, combined with common amalgam, would only injure the preparation, from the fact of its readiness to oxidize in the mouth, forming a soluble oxide, which would endanger the pulp of the tooth. Amalgam of this metal has been used by some in the profession, the consequences being destructive to the tooth, or teeth, so far as they have come under my own observation."

* * * * * * * * *

"Now, in relation to amalgam and its place in rank, as a filling, I unhesitatingly place it next to gold for permanent use; many would, no doubt, give tin-foil the preference.

"Permit me to make a statement. Take any mouth, or any number of mouths, with decayed teeth in every and all stages of decay, and let any first-class operator fill all decayed teeth on one side of the mouth with gold, and all on the other side with best quality of amalgam, say all back of cuspids, the same skill and care being used in both; then turn loose the patient and await results.

"In my opinion, based upon observation, the side of the mouth filled with amalgam, in ten or twenty years, will be found to be in a better condition than the other. Why this prejudice against the mercury, which is the demon in amalgam?

"Why is there so little prejudice against rubber plates, which contain mercury and make mouths more or less tender and sore in a majority of cases? and why is the profession so much exercised about the rubber monopoly and suits in the past, when it has been universally admitted that cheap rubber work has caused more demoralization in the ranks than all other causes together? I will except nitrous oxide gas. Again, suppose we take a case of two dead teeth,—*molars,*—with part of the crowns gone, and in the one case fill fang canals with gold or anything else, and build on a crown with gold, with retaining points and screws in the most approved method; and take the other, fill the fangs with os-artificiel, and build on a crown with amalgam and retaining screws, if necessary, of silver.

"Which tooth will be most likely to give trouble? The one, we will suppose, has received some two thousand strokes with the mallet, with considerable jarring, and cost, say, thirty dollars; the other has received no jarring at all, and cost, say, five dollars. Which tooth will be most likely to cause after-trouble? Amalgam has its uses and abuses, like other things, but it is more sinned against than sinning."

Then followed a paper entitled "The Physiological Properties of Dental Amalgams," by the late Prof. T. B. Hitchcock, read by Prof. Thos. H. Chandler. With some abridgement of the paper as read, its substance is here presented:

Dr. Hitchcock wrote, that while in Europe, during 1871, his attention was directed to amalgams for filling teeth, with the result, upon his return, of the commencement of a systematic investigation of the subject.

He states that for some years it has been well known that many of the dental amalgams contracted while hardening, and refers to the first attempt to ascertain the relative amount of change which occurred in several varieties. These records are by Mr. John Tomes, in Transactions Odontological Society of Great Britain, vol. iii. (1861).

Of seven experiments with various alloys, six showed contraction, while the remaining one, which was a compound of pure copper and mercury, was much superior to any of the others in this respect.

One of the simplest experiments was first suggested by Mr. Thomas Fletcher, of Warrington, England.

It consists in making a filling in one end of a glass tube, care being taken not to touch the end of the tube holding the plugs, for fear of false results from the action of the heat of the hand. After the filling is completed, partially fill the tube with blue ink. If the filling contracts, the ink penetrates between it and the wall of the tube.

He next refers to the experiments of Mr. Charles Tomes, in proof of change of bulk, ascertained by the specific gravity test.

The amalgam to be tested is weighed in water; after it has hardened, it is again weighed in water. In every instance weight was gained, showing diminution of bulk. Mr. Tomes found that in one hundred parts of the following amalgams the weight gained by each was as follows: Palladium, .037; Sullivan, .07; Ash, .14; Smale, .14; tin and silver (55 to 45), .35; tin and silver (equal quantities), .38.

It is seen that amalgams composed entirely of silver and tin contract the most.

Watts's Dictionary of Chemistry states that the specific gravity of pure copper amalgam is the same before and after hardening.

It seems fully proven that the presence of copper in an amalgam lessens the amount of its contraction.

Mr. Fletcher says that shrinkage is not the worst evil, but that the tendency of perhaps all amalgams is to spring away from their originally packed shape and assume a globular or spheroidal form.

He came to this conclusion from the fact demonstrated, that some of the compounds which shrank the most become defective only near the top edge of plugs, and at the middle of the depth of cavity remain perfectly tight.

In some instances, tubes of three or four sides were used instead of round ones, but in nearly all instances this spheroidal tendency was developed.

In 1868, Mr. Mummery stated that "some kinds of amalgam expand in hardening."

In 1872, Mr. Fletcher stated that amalgams composed of silver and mercury alone expand, and sometimes sufficient to split the tooth.

Mr. Kirby (1871–1872) states that precipitated silver amalgam expands "to the extent of $\frac{1}{40}$ diameter or more."

The projection of filling material beyond the edges of cavities is mentioned, and it is asserted that, as very little, if any, pure silver amalgam is used at present, some other cause for this must be found besides the expansion of silver and mercury.

Mr. Fletcher suggests that the plugs may be raised by the "decomposition of tooth-substance and formation of gas under the loosened plug, the driving down and accumulation of food underneath, or some similar cause."

Dr. Hitchcock suggests that edges of fillings are left extending over margins of cavities, upon sound tooth-substance, and are broken away by wear, and states that Mr. Tomes recognizes this cause.

Another feature which is noticed in amalgam fillings is their discoloration—sometimes dark or black, and sometimes yellow.

The test suggested by Mr. Fletcher for determining the relative tendency of different alloys to discolor, is to "nicely polish the plug and subject it to the action of sulphur in a solution of sulphuretted hydrogen."

Silver is acted upon by sulphur, the result being the black sulphuret of silver. Tin alone is not acted upon by sulphur; but sulphur acts upon an alloy of tin and silver, the amount of discoloration being determined by the relative proportions of silver and tin. If gold or platinum be added, the discoloration is said to be less. With copper it is increased. Sullivan's cement presents a very black surface. Amalgams containing copper, besides becoming black, usually stain the teeth.

Mr. Tomes attributes the copper stain to the following cause: "The sulphide of copper, exposed to air and moisture, becomes oxidized, and forms the sulphate. The sulphate is freely soluble, and hence is likely to permeate the dentine, when it will again be converted into sulphide."

Palladium, which contracts very little, turns quite dark after being in the mouth a few weeks. It does not, however, stain the tooth, because, being moisture-tight, the fluids are unable to penetrate between it and the tooth-substance.

Cadmium, either alone or combined with silver, tin, or both, has been used as dental amalgam. Introduced by Dr. T. W. Evans,* of Paris. Fillings of this alloy are said to have contracted largely, and become quite soft. Their surface is covered with a yellow sulphide, which penetrates the dentine, which is generally carious.†

Consideration of the Different Metals and Alloys.

"Tin alone forms an amalgam with mercury, which requires considerable time to harden, and never becomes sufficiently hard to properly protect the tooth.

"In combination with silver, it hardens well, but the addition of silver not only adds to the discoloration of the mass, but nearly all amalgams of tin and silver contract, and some of them to a very marked extent. Mr. C. Tomes‡ found the weight gained, when weighed in water, by 100 parts of an alloy of silver 45, and tin 55, to be .35. These proportions are not very unlike those of Townsend's amalgam, which, according to the Dental Cosmos, October, 1855, is composed of silver, 4; tin, 5. My own experiments with several amalgams of this class all show shrinking and discoloration.

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* American Journal of Dental Science, October, 1849.

† John Fairbank, M.R.C.S., in B. J. D. S., 1872, p. 252.

‡ "On the Chemical and Physical Properties of Amalgams." Transactions of Odontological Society of Great Britain, March, 1871–2, vol. iv., new series.

"The addition of copper lessens the shrinkage, but increases very greatly the discoloration. Many of the earlier amalgam fillings were made of coin silver,—thus combining silver and copper,—and although they usually discolored considerably, still the results obtained, as far as regards decay around their edges and under them, were not entirely unsatisfactory. Gold alone does not harden well with mercury. When added to an amalgam of silver and tin, however, it produces a decided effect in lessening not only the shrinkage, but also the tendency to ball up and round itself in the angles; but while it does this, it greatly retards the setting.

"The action of gold is well shown in the paper by Mr. C. S. Tomes, before alluded to. Selecting an alloy of silver and tin, which he knew contracted largely, he added gold to it in increasing proportions, and by means of the specific gravity test obtained the following results as the relative amount of contraction of each alloy:

Silver 4.5 Tin 5.5		.33
Silver 4.5 Tin 5.5	+Gold 1	.16
Silver 4.5 Tin 5.5	+Gold 2	.086
Silver 4.5 Tin 5.5	+Gold 3	.055
Silver 4.5 Tin 5.5	+Gold 4	.037

"This last kept its color well, but Mr. Tomes questions if it becomes hard enough for use in the mouth.

"A larger proportion of gold did not harden well. The experiments of Mr. Fletcher, by means of the glass tubes, also show that gold lessens contraction.

"Mr. Kirby* states that an amalgam of an alloy of 3 silver and 2 of tin contracts slightly at first, but finally expands about $\frac{1}{500}$; 2 parts silver, 1 of tin, and about 25 per cent. gold, expands without contraction.

"Ash & Sons, London, sell an amalgam which is supposed to consist of silver, tin, and gold. An alloy of gold 1, tin 2, silver 3 parts, has been used in England. It is said that these alloys keep their color well, but do not become very hard. Gold also makes the amalgam more plastic.†

"We are told by Mr. Fletcher‡ that antimony also possesses this power of controlling contraction; in fact, when added to alloys of silver and tin, it causes at first slight expansion, and reduces the total contraction in about the same proportion as when gold is used.

"Platinum alone, from the difficulty with which it forms an amalgam, seems to be unsuited for our purposes. When combined with tin in about equal proportions, it forms an amalgam, but does not harden well, and it becomes softer if the proportion of tin is increased.*

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* T. O. S. G. B., vol. iv. p. 189.

† Tomes's System of Dental Surgery, 1873, p. 336.

‡ B. J. D. S., 1872, p. 254.

"Mr. Tomes† says: 'Some of the experiments made with platinum and tin furnished beautifully smooth, white amalgams, which might, I think, prove useful as temporary fillings. They keep their color well, and become sufficiently hard, with the addition of a very small quantity of silver, to stand in any position where they are not much exposed to mastication; and the fact that they do not shrink much, and that they remain sufficiently soft to be readily removed with an excavator, would make them probably suitable for temporary fillings.'

"By the addition of gold and platinum to silver and tin alloys, we obtain one agent which controls to a great degree the shrinkage, and another which causes the amalgam to harden quickly. Mr. Fletcher, who, as far as I am aware, was the first to suggest the use of an alloy of this kind for amalgams, says that the amalgam called 'platinum amalgam' is composed of the ordinary silver and tin alloy with 10 per cent. fine gold, to which sufficient platinum is added to cause it to set quickly.‡ When used with a small amount of mercury, it becomes so hard that often at the same sitting of the patient it can be finished with files and burnishers. It moreover keeps its color well.

"Palladium is a metal which is found in platinum ore, and it strongly resembles platinum in color. In very fine powder, as a precipitate, it forms an amalgam, but the two metals require considerable stirring in the mortar to cause them to combine. When the combination has begun, the palladium will take up a very large amount of mercury, and unless there is a considerable quantity used, and the amalgam is made very soft, it will harden before it can be placed in the cavity of the tooth. In consequence of the extraordinary rapidity with which it hardens, a large amount of heat is evolved, which is sometimes so great that the mass explodes. This can be avoided, and the amalgam rendered much more manageable, by using mercury in which a per cent. of pure gold has first been dissolved.

"It seems that palladium amalgam has been in use to a limited extent in Europe for many years, and those who have had the most experience with it speak highly of it. As before stated, however, it becomes quite black on the surface; though I am induced to think that, in those instances in which I have used gold with it, the discoloration has not been so great. As it shrinks so slightly, there is no discoloration of the tooth-structure. The plug made by it is extremely hard and brittle. It is a metal which is very difficult to obtain. I found it impossible to purchase more than a few dwts. in this country. By sending to Europe, it can be obtained either as precipitate or plate. The price is very high, costing somewhere in the vicinity of fifty dollars per ounce.

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* Fletcher, in Brit. J. D. S., 1872, p. 90. C. S. Tomes, T. O. S. G. B., vol. iv. p. 151. C. S. Tomes, etc., T. O. S. G. B., vol. iv. p. 151.

† C. S. Tomes, T. O. S. G. B., vol. iv. p. 155.

‡ Fletcher, in B. J. D. S , 1862, p. 254.

"When added to a gold, silver, and tin amalgam, it hastens the setting about the same as platinum does.

"Mr. Fletcher* speaks well of tellurium, which he thinks, either alone or in combination with other metals, would make a good amalgam. The price of this also is very high.

"OF THE MANNER OF USING THE DIFFERENT METALS AND ALLOYS.

"The most diverse results may be obtained by the manner in which the various amalgams are prepared; even the best may be rendered worthless by improper manipulation.

"In order to obtain the best results, the mercury used should be only sufficient to cause the mass to cohere.

"A true amalgam should contain no free mercury, but as usually prepared, there is a very great excess. If only a small proportion be used, the amalgam hardens very much sooner. If the cavity to be filled will permit it, the amalgam should be used very dry, and even granular; and although it is worked with some difficulty, the result obtained is much more satisfactory. The use of heated instruments in condensing facilitates the operation by rendering the mass more plastic. If the cavity is a less favorable one, use the smallest possible amount of mercury, and depend upon heated instruments to aid you. Used in this manner, quick-setting amalgam will become hard in a short time, so that at the same sitting the filling may sometimes be polished with a file and burnisher. An amalgam hardens quicker when the filings or cuttings of the alloy are moderately coarse than when they are fine. When they are freshly made, or have been kept from the air, they also harden sooner, and moreover discolor less. A quick-setting amalgam, as a rule, is greatly to be preferred to those which harden less rapidly, because it is less likely to suffer from mechanical injury by mastication and other causes, and is less likely to discolor from the smaller amount of mercury used. It can be polished sooner, and, most important of all, it can be condensed about the edges after it has partially hardened.

"Amalgam fillings should always be carefully polished and burnished, if we wish to obtain the best results. Many fillings will retain a bright surface for years if polished, which otherwise would be quite dark.

"By experiment, it is shown that if Fletcher's platinum and gold alloy be combined in the proportion of 10 grs. of alloy to 5 grs. of mercury, it will require about 1½ hours for it to become sufficiently hard to file;

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* B. J. D. S., 1872, p. 90.

whereas, if 10 grs. of alloy be combined with 2½ grs. of mercury, the plug will be hard enough to take a fine finish in 15 to 20 minutes, and to file in about 35 minutes.*

"The slight amount of contraction, or change to a spheroidal surface, which some of the best preparations are subject to, occurs just before hardening, and if the edges of the filling are carefully condensed with a plugger after the amalgam is nearly hard, this change of shape can be almost, if not entirely, compensated for. This is an important point, and should always be faithfully attended to.

"When an excess of mercury is used in amalgam, it always comes to the surface, and an unequal plug is the result; moreover, the tendency to contract, or assume the spheroidal shape, is very largely increased. Mr. G. H. Makins, Lecturer on Metallurgy in the London School of Dental Surgery, well states the case as follows:†

"'Amalgams, as a rule, are compounded of a metal with mercury, which compound is further dissolved in an excess of mercury; and although, when subjected to pressure, this excess is largely squeezed out, as in larger ore operations for gold or silver separating, yet it is very difficult to do this to such an extent that no free mercury is retained. And, indeed, by much the same action as when one squeezes a sponge containing a fluid, you get the mercury forced to the whole surface, and thus, in your operations, what is so forced between the sides of the cavity and the plug, by slow and gradual vapor exhalation, is liable to leave a minute interspace.'

"For when too much has once been added, any pressure to which we can subject it with the chamois-skin and plyers will fail to remove all the excess. The best results will only be obtained with a very much less amount than will remain after any attempt to remove the surplus by pressure.

"The use of only a proper amount of mercury precludes the washing of the amalgam. With whom the idea of washing amalgams originated I am unable to say; but it seems to be practiced to a large extent. Many of the manufacturers recommend it. If they had taken the trouble to properly test plugs made of amalgam which had been washed, they would have been less ready to advise it.

"If only the proper quantity of mercury is used in making the amalgam, there is but a very small amount of oxides present, and consequently less necessity exists for their removal. By an excess of mercury we get just what the washing is designed to remove.

"Even if it were possible to remove all the excess of mercury after washing, the amalgam would still contain more or less water, which can only be removed after much trouble.

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* Fletcher's Letter, December 10th, 1873.

† "On the Union of Metals by Welding," T. O. S. G. B., vol. iv. p. 197.

"Tests made by Mr. Fletcher with amalgam plugs containing an excess of mercury, and with amalgam which had been washed, gave the following results, viz.:

"'The plugs mixed with an excess of mercury are distinctly more imperfect, and have a decidedly greater shrinkage in every case. The proportion of mercury left in after thorough compression with powerful plyers is about double what is necessary to make a good amalgam,—and the excess of mercury cannot be squeezed out without making the amalgam so hard as to be unworkable; also, in packing, the mercury comes to the surface of the filling, making an unequal alloy. As regards washing, when once wet, I have *never* in any single case been able to get the amalgam properly dry without an amount of trouble such as would not be taken by ninety-nine operators out of a hundred, and the water works to the face in packing. Several plugs put in smooth parallel tubes, with an amalgam which had been washed, slipped out after hardening, on the slightest force being applied. With amalgams which had not been washed, this was most decidedly never the case under any possible circumstances with amalgams of moderate shrinkage.'*

"My own experiments, made under similar conditions, agree entirely with the results obtained by Mr. Fletcher.

"I wish now to ask your attention to an examination of the results of those experiments which were made with American amalgams. I selected several kinds—those which seemed to be used most largely—and subjected them to the following tests, viz.:

"I. For shrinkage.

"II. For discoloration.

"The shrinkage tests were of three kinds:

"1st. Fillings were made in glass tubes of one-fourth of an inch bore. The alloy was carefully weighed in each instance, and the mercury added until sufficient was present to render the amalgam plastic. In most cases, I think the mass was finer and contained less mercury than is commonly used by those dentists who do not wash their amalgams. The proportion of mercury varied in nearly every case, some alloys requiring a much larger amount than others. The plugs were most thoroughly and carefully packed, special attention being paid to the edges, which always received the final condensation. I tried to make a perfect plug in each case. As soon as the plugs were finished, the tubes were partly filled with blue ink, and to prevent its evaporating a small cork was inserted in the upper end of the tube. After several days the corks were removed and the tubes emptied of the ink. Any shrinking of the filling of course allows the ink to penetrate between it and the tube. The point for examination, therefore, is the penetration of fluid past the top edge. If there has been no leakage, this edge should be sharp and well defined. The next experiments were made in the same manner, but with amalgam which had been washed and which contained a much larger proportion of mercury. In some cases the weight of the mercury was even equal to that of the alloy, and even then a few were rather hard to wash well. Most of the amalgams were washed with warm water and soap, and, after washing, as much of the surplus mercury as it was possible to remove was pressed out with chamois-skin and plyers. These plugs, as I have before stated, did not give nearly as good results as those which contained less mercury and were not washed. I therefore determined to try another series of tests with amalgam which should contain only a minimum of mercury, having the mass rather dry and perhaps somewhat granular. With a little care these packed well, no mercury coming to the surface except in one instance. For these tests I used tubes containing corners three or four sided; unfortunately these were rounding, and not sharp or acute as we find them in the cavities of the teeth, so that they do not illustrate the drawing away from the corners as well as I had hoped.

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* Letter of December 10th, 1873.

"2d. Fillings in the V-shaped trough which I have before described. These all show contraction with the exception of one of precipitated silver, which shows expansion.

"When the pieces are put in the trough now, they show contraction upon their sides, *i.e.* shrinkage away from the edges, so that they rest upon their lower corner and can readily be rocked back and forth.

"3d. By weighing in water, as suggested by Mr. C. S. Tomes, a given amount of amalgam was used in each case, and its specific gravity obtained as soon after mixing as possible. After twenty-four hours the specific gravity was again taken. If the mass contracted, of course its specific gravity was greater, and *vice versa.*

"II. *Color Tests.* This was by the method of Mr. Fletcher, before alluded to. Two glass tubes of each kind of amalgam—one washed, the other not—were selected, and the exposed surface of the plug nicely polished; they were then placed in a solution of sulphureted hydrogen for nine hours.

"The foregoing tests are not so satisfactory as could be wished. The alloys of silver, tin, gold, and platinum, seem on the whole to give the best results. Now, if good results can be obtained with this alloy once, why can they not be had uniformly? Are not all the necessary conditions under control? and can we not make use of them? It seems to me we can with two exceptions, the more important of which lies with the manufacturer. The first is one of minor importance. I refer to discoloration of the fillings in some positions in some mouths. These positions are not the masticating surfaces of the teeth, but principally the proximal and buccal. And there are many mouths in which the discoloration even here is slight. None of us expect these fillings to remain bright in the majority of mouths. Even gold fillings sometimes change color, and how much more readily may we expect the same result with alloys composed principally of metals for which many of the chemical agents of the mouth possess strong affinity.

"The second, as stated, has to do chiefly with the manufacturer. In making the alloy, the metals used should be chemically pure,—fine tin and fine silver are seldom pure, and platinum often contains iridium and copper.* The mercury is also often impure. Examination of some which was sold with an amalgam as "distilled mercury, chemically pure," showed evident adulteration to the eye, clinging to the sides of the bottle as it was turned either way.

"Some of the manufacturers state that each lot of amalgam should 'be thoroughly tested by a competent dentist before offering it for sale.'† Now, if this test has reference to fillings in the mouth, I take exception to it,—for the result of the test cannot be known often under several months. The testing should be done by the manufacturer, and not upon each lot, but upon each ingot, and the simple yet delicate means of testing which he may readily make use of should enable him to place upon the market an alloy which, when combined with a proper amount of mercury, will give uniform results. I stated above that the exact proportions of certain alloys were of little importance, and for this reason: It is impossible by any care or experience in making them to get precisely the same results. Mr. Fletcher‡ states that the addition of the proper amount of platinum to silver and tin is 'troublesome to make, as the proportion of each metal requires to be very exact, a state of things seriously interfered with by the platinum unless very great care is taken, from its curious property of combining with tin at a red heat, with an evolution of heat so intense as to drive off a large portion of the tin instantly, and occasionally to project the whole mass out of the crucible with an explosion, or to split the crucible from sudden expansion.'

"A uniform amalgam can only be obtained by careful testing. Mr. Fletcher§ says, 'the special point is not so much the composition of the alloy, as that it is tested for shrinkage, etc., in the ingot, inch by inch.' By any process of melting, it is impossible to make an alloy which will give good results always. Each ingot should be tested at least at each end, and only those which prove satisfactory should be put upon the market; the remainder should undergo correction by the addition of platinum or gold, as the tests indicate. Sometimes some of the ingots will require melting and correcting six or seven times before they are satisfactory,—they will consequently contain a much greater proportion of gold or platinum than the ingots which came right at first and needed no correction. If the manufacturers wish to place a good article in the market, and will take the trouble to do so, they can. It should be the duty, however, of every dentist before using any of these alloys to test them himself. Mr. Fletcher[*] states the case well when, after saying that the tests are so easy to apply, he remarks that 'the amalgams used for the future must stand really upon their own merits, and not on the statements of the makers, which up to the present have been anything but a guide to their qualities.'

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* Fletcher's Letter, October 11th, 1873.

† Arrington's Circular.

‡ B. J. D. S., 1872, p. 90.

§ Letter of May 11th, 1872.

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"The results of these investigations I confess have somewhat modified my views in regard to dental amalgams. The fact also that experiment has proved that more care is needed in making fillings of adhesive gold, which shall be moisture-proof, than has generally been supposed, has decided me to use amalgam for filling some cavities which are very difficult of access. While I am willing to admit that a good amalgam is better than a poor gold filling, still I do not approve of its indiscriminate or general use. If an operator is unable to manipulate gold properly, he is unqualified to practice dentistry, and his first duty to himself and his patients is to become qualified. I did not at first propose, nor did I think it necessary, to allude to any special make of amalgam, but after I commenced the tests the results obtained were so positive that I was led more thoroughly into the subject, and I then became convinced that an investigation, to be of practical value, must include the consideration of all the amalgams in common use. If these investigations, commenced for my own satisfaction entirely, shall be of any help to my professional friends, or shall lead to the placing of a uniformly reliable article in the American market, I shall feel amply repaid for the time spent upon them."

Dr. E. A. Bogue then read a paper entitled "The Physical Properties and Physiological Action of Dental Amalgams."[†]

The following discussion on the papers then ensued:

Dr. Thomas H. Chandler, of Boston. It seems to me that the labor that has been expended on these papers is worthy of something more than passing by in simple silence. For myself, I feel deeply grateful to these gentlemen for having submitted to us the valuable results of their research.

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[*] B. J. D S., 1872, p. 301.

[†] This paper was published in the Dental Cosmos, March, 1875.

With regard to amalgam, viewed in the light of these researches, I have almost come to the conclusion that wherever we can make a *perfect* amalgam filling we can make a perfect gold filling. There are a thousand little things that defeat us in the operation; mercury working to the surface, not only the outer surface under our pluggers, but the surface between the filling and the tooth. Mercury going there leaves a film, which, being afterwards reabsorbed into the filling, leaves a space or crevice.

Again, in reference to washing or wetting; it is next to impossible to get water out, if it once gets into amalgam.

We think, perhaps, we can hurry up matters, and if there is a little moisture round the edge of a filling, it is no great matter, we can pack until we squeeze it out; but we cannot do it.

There are many difficult places about the mouth where we cannot use amalgam and be sure of the best results, simply because it is impossible to keep the tooth dry. In these cases we cannot make perfect amalgam fillings, no matter how good the amalgam may be. Hence, if a moisture-tight plug be essential to the preservation of the tooth, we may about as well attempt to use gold as amalgam.

Dr. N. W. Kingsley. I would offer a resolution of thanks to Drs. Cutler and Bogue for the able papers we have listened to, and for thus placing before us the very valuable results of their thought and investigation in this direction; and I desire also that the resolution shall show respect to the memory of him who is dead, and whose paper we have heard read, by way of acknowledging the indebtedness under which he has left us, as a profession, for various and valuable contributions to dental science. All these papers bear the impress of patient and persevering research, and for the results of their experiments the dental profession will give these gentlemen their hearty thanks.

The motion was carried.

Dr. James Truman, of Philadelphia. I feel that this vote should not be wholly passed by without further remarks. It seems to me that these papers are worthy something more than a mere vote of thanks.

As I sat here listening to the reading, a new era seemed dawning upon our profession,—one that was to be characterized by individual work and laborious investigation. I must confess that I have been very much enlightened by the reading of these papers, and acknowledge to the removal of some prejudices that have been engendered during years of practice. I have always ranked myself among those who have opposed the excessive use of this material; but if the conclusions drawn from these investigations be correct, the opinions heretofore entertained must undergo modification. It would seem impossible to answer some of the arguments brought forward.

I regret, with others, the untimely death of Prof. Hitchcock. It has deprived the profession of one of its most useful and honorable members, and one who was doing much good in the direction of original investigation. His ardent temperament may have led to excess of labor, but while we sadly feel that he fell a sacrifice to his love of scientific truth, it is, nevertheless, true that the work he performed so well is what we most need at the present time. It is certainly a most promising indication of a higher professional standard that an increasing number are engaged in original investigations, in a generous rivalry to enlighten each other.

Dr. E. A. Bogue. Dr. Chandler says that he has almost come to the conclusion that wherever a good amalgam filling can be put in, a good gold one can be likewise.

I will state an incident in my own experience that illustrates to some extent the different saving properties of gold and amalgam fillings in certain cases of difficulty. In 1865 a patient with strong, firm teeth was in my hands for treatment; I felt much solicitude about one of the teeth, and called in Dr. Bronson, to consult him in regard to what was best to be done; he was also called in when the work was finished, and I was much pleased to have had his approval in the case.

The right and left lower molars were both filled with gold. The right upper molar was filled with Morgan's plastic gold, with which I was experimenting at the time, and, I may say, somewhat in the dark.

The left upper bicuspid was so broken away that I did not feel that it was expedient to fill it with gold, and I knew of no other substance which seemed so well adapted to the case as amalgam. I did not know anything about the use of it, not even how to put it in properly. However, I filled it with that material as best I could, supposing that the tooth would break off before long.

Within the past six weeks that patient has been in my hands again, for the first time since 1865, and nothing has been done upon his teeth meanwhile. Those two lower molars filled with gold broke away two or three years ago. There was very little left of one tooth,—only the anterior portion of the buccal cusp; of the other tooth, nothing above the roots. The right upper molar, in which was a large cavity filled with crystal gold, I found still perfect. The left upper bicuspid, which I filled with amalgam, was discolored around the filling, but there was nothing broken, and the tooth was in good condition, excepting that it was dark-colored. I took that filling out and found what seemed to be an oxyd of the metal under and around the filling, but I did not find any further decay in the tooth. I don't know what amalgam I used; I don't know that my book shows. It is perhaps needless to say that I filled all these teeth with amalgam this time.

I am greatly indebted to Dr. Jack for the manner in which I was able to fill them, and I wish he would explain to the other gentlemen present what he was kind enough to explain to me long ago,—his mode of matrix filling. I built on with gutta-percha to the tooth I wished to fill, the shape I wanted my future filling should be; of that tooth and the adjoining two teeth I then took an impression, and made a hard rubber matrix, which surrounded the two teeth adjoining front and rear and left a complete ring around the tooth I wished to fill. This matrix was adapted to the mouth, and so fixed that the patient could shut the teeth; thus I had a well in which to pack my amalgam as hard as I pleased. The filling was then inserted and the patient went home, retaining the matrix until the next day, when it was removed, and the filling was polished down and burnished.

The next case is that of a young lady, weak and frail, and much of the time an invalid, and who would not endure the mallet. She first went, I believe, to Dr. Kingsley, who became disgusted with the case, not knowing what to do for such frail teeth. She finally fell into my hands, and I became equally disgusted. Her teeth were like chalk and extremely sensitive, and it did not seem as if anything could be permanently done. Into that mouth I put my first amalgam filling, in a badly decayed molar with two walls. The date I don't precisely know. Of course it was anterior to the last mentioned.

That filling I saw two months ago, and it is still in just as good order as when it was put in, excepting a slight discoloration around the edges, not deep.

Now, considering my inexperience in the use of amalgam, and the fact that I was obliged to go to my neighbor to ask him how to put in that filling, I think that is a noticeable case. It does not show a great deal, but it shows something. It is cumulative evidence in favor of amalgam fillings, where gold seems inexpedient from any reason; and now that we may be certain that the health can in no way be affected by such material properly inserted, we have but to make a good selection, and use care in its insertion, to feel very certain of good results from its use.

Dr. John B. Rich. Of late years I have had very little knowledge of amalgam. But nearly thirty years ago I had some experiences in connection with it, which resulted in a great degree of mortification to me. About that time a bitter controversy arose among the dentists of this country on the subject of amalgam. With very few exceptions, the most eminent men in the profession throughout the United States denounced the use of it in unmeasured terms. They stated that it was a dangerous and poisonous substance, and in all respects an unfit material for filling cavities in the teeth. And they further characterized the use of it, for such purpose, as a dishonest practice, and the very worst kind of charlatanry.

Foremost among those who denounced its use was Dr. Eleazar Parmly of this city, who, at that time, stood, by common consent, at the head of the dental profession in this country. I had always regarded him as a reliable mentor to guide me in the adoption of the proper principles to govern me in the practice of my profession. He had been most kind to me in the early part of my professional life, and I had always found him to be an eminently practical man, whose opinions were based upon close observation and experience. We had often conversed together upon the subject of amalgam; and some years before the breaking out of the controversy on that subject, we had both taken an active part in exposing the impositions of a person who called himself Monsieur Mallan, who used nothing but amalgam for filling cavities in all parts of the mouth.

The action in relation to amalgam, so far as the American Society of Dental Surgeons was concerned, commenced in 1841, and reached its height in 1847, when several of its members were expelled because they would not sign a pledge not to use it in their practice. Dr. Parmly was, at that time, the president of that society, and a large majority of its members took sides with him against its use; and the subject occupied the time and attention of that body, almost to the exclusion of any other business, for several years. The debates in relation to it were at length carried on with a great degree of feeling. Those opposed to it being in the majority, were determined that the society should be purged of those members who would not take sides with them against it, and many members resigned rather than ,be subjected to such discipline; while others stood up and fought against such action on principle, although they did not want to use it, and were eventually expelled from membership.

The result of this action on the part of the majority was most unfortunate. Men who had been friends for years became bitter enemies, and the usefulness of the society was at an end. And yet I believe now, from what I have known of those who so arrayed themselves against the use of amalgam, that they were entirely honest in what they said and did in this matter, and that they truly believed their action was for the best interest of their profession.

I believed that my action was right, and no one took a more active part in that society against its use than myself, and both in the society and out of it, whenever I could get a chance to talk about it, I denounced it as strongly as anybody. I had formed my opinion in relation to it from what I then believed to be the practical experience of Dr. Eleazar Parmly, and I believed in him. But some time in 1848, while I was still full of enthusiasm and activity in this matter, a circumstance occurred which changed my enthusiasm into distrust of the course I had been pursuing, and led me to make investigations into the properties of amalgam, which proved that its opponents were wrong.

This circumstance I will briefly state. One of my patients introduced a lady to me, upwards of thirty years of age, who had just arrived from England, and had suffered much from her teeth during the voyage here. She requested me to use my best skill to save what teeth she had left. Upon examination I found but two teeth had fillings in them, and these were the two upper cuspids, that were filled at the point where those teeth join the bicuspids. They were quite large fillings, and composed of amalgam. They looked bright and fresh, and from that circumstance, I supposed, they had been put in just before she left England.

After I had treated several of her teeth, and had gained her confidence in my professional skill, I spoke about the two fillings, and told her they ought to be taken out and the cavities filled with gold, as the amalgam would not preserve the teeth. She at once assented to that proposition, and I removed the amalgam.

There was no vestige of decay. The cavities had been well prepared, and looked as fresh and clean as if they had just been excavated, and the teeth were perfectly preserved.

As I removed the last portion of the amalgam, I casually asked how long they had been filled. To my great astonishment and confusion she told me they had been put in when she was at school, and about sixteen years of age, and that she had not been to any dentist since that time,—and stated some incidents that had fixed the time in her memory.

This was a new revelation to me, this result of filling with that substance.

I did nothing more to the cavities that day but to fill them with wax, as I was anxious that Dr. Parmly should see them in the condition they were in when I removed the amalgam; and as soon as the lady departed, I went immediately to him, and told him what I had seen and the statement of the lady; and, as he lived but two blocks from my house, I asked him if he would not call at my office in the morning and examine this, to me, most extraordinary case. He said that he would like very much to see the patient, if I would bring her to his office. Upon telling him that I would not like to take that liberty with her, he said he would be busy next day, and could not possibly call at my house to see her. I left him, very much mortified at the manner in which he treated my request and information; but, upon reflection, the idea occurred to me that perhaps I had not stated the case clearly to him, and I resolved to go to him again that evening. I acted upon this thought, called again in the evening, told him how much this case had interested me, and asked him if he had had any such experience in the use of amalgam.

He surprised me very much by saying that he had never used it, or experimented with it in any manner.

I then said to him, "Do you really say that you have denounced this substance, and the use of it, in the terms you have without ever having investigated its merits at all?" His reply was, "I do say that I have neither used nor experimented with it in any way. *I would not touch the nasty stuff!*"

I can scarcely tell you, gentlemen, what a blow this was to me; and I told him so; and also that I had taken the side that I had in the "Amalgam Controversy" mainly from what he had said to me about it, and that I was deeply mortified to know that he, in whom I had so believed, knew nothing about the substance he had said and done so much against.

This interview ended our professional intercourse; for I felt that he had led me into an error which might be a subject of regret to me my whole life. And so it has proved. I immediately instituted a series of experiments to ascertain the properties of this substance. I had a water-bath prepared, and arranged so that it could be kept at a temperature of one hundred degrees of Fahrenheit. I prepared three kinds of amalgam, of different proportions of mercury and Spanish coin silver: these were placed in small vials, along with fragments of tooth-bone, and immersed in every condition of saliva that I could procure.

The vials were placed in the bath, and kept there nearly a year, when the fluid in which they were immersed was carefully analyzed; and I need scarcely say that nothing poisonous or injurious to the system was found; thus proving, beyond a doubt, that the main charge brought against amalgam, as being a poisonous substance, was utterly false and without foundation.

In conducting these experiments I had the assistance of my friends Dr. John Torrey and James R. Chilton, both eminent chemists.

At the next meeting of the American Society of Dental Surgeons, I stated in detail the experiments I had made, and their results, using my best endeavors to have the society rescind the "Amalgam Resolutions," and, as an act of justice, restore to membership those who had been forced to resign on account of their action, or had been expelled for refusing to comply with the mandates of the society in relation to them; or, if they were not prepared to act upon the information I had presented, to appoint a committee to make similar experiments to those I had made, and report at the next meeting.

All of these propositions the society refused to entertain, and would not examine the subject at all. Under these circumstances I could not remain in fellowship with them, and resigned my membership.

Since that time I have used amalgam in rare cases, where filling with gold was impossible; but they could not be considered as fair tests. I think that I cannot do as well with it as with gold, where gold can be used.

Dr. J. W. Clowes. I have had some little experience with amalgam. While I have believed in it, I have tried to show by my practice that my belief was well founded.

I have tried to use both gold and amalgam properly, and I have never been able to discern any difference between the saving qualities of the two. This faith I have had, and this practice I have kept up for some thirty years, and you can hardly understand, gentlemen, how much I am delighted to be so well supported here in respect to a filling that has been so condemned by the profession and the public generally.

However many may have gone crazy over the idea of amalgam, or however much harm may have accrued from borrowing needless trouble on this subject, certainly no one was ever injured by the thing itself. You know that I have always been enthusiastic in this matter, and that I read a paper on this subject some years since, which, if I make one exception, was favorably received; and I think that very person, if he should speak sincerely now, would retract some things he said then.

I will simply say what I said at that time, that amalgam is not only a good material for filling, but a safe one, and that it saves teeth which could not be saved by any other means.

Dr. Jno. T. Codman, of Boston. Among this number perhaps there are some who propose to continue experiments with amalgam, and to such I would suggest a metal which has not been tried, save to a very limited extent, as a component part of our amalgam, and that is zinc. Experiments made by Dr. Keep, of Boston, some few years ago, show that zinc can be used in amalgams, and it is, as we all know, a pure and harmless metal.

Dr. A. H. Brockway. I am under lasting obligation, as every one present must also be, to those gentlemen who have submitted papers on this occasion. I think the value of them can scarcely be overestimated, for they have given us information that we greatly needed.

There has been an impression in the community, which has been shared largely by the profession, that amalgam was a dangerous article to use; I was so taught by my preceptor, the late Dr. Westcott, and for many years refused to use it, but I have done so occasionally for the past fifteen years, and I never yet have seen a case of injury produced by it. I never have seen a case of mischief in the mouth which has been attributed to amalgam that would not have been produced by the use of any other material used in the same way. We must bear in mind that amalgam has not had as fair a test as other materials, in that it has, as a rule, been used only in the most difficult and doubtful cases. And here I wish to dissent from the statement which has been made, that where amalgam can be used gold might be used about as well. The semi-plastic quality of amalgam and the manner of its working are such as to permit its use in many cases where it would be impossible to make a good gold filling, or, if not impossible, so extremely difficult as to render it unwise to subject the patient to the necessary fatigue and expense for what must, in the nature of things, be at best but a doubtful operation.

But there are some operators who use amalgam occasionally in simple cavities, on the score of economy, either of time or material; this I think is a mistake, because gold or tin foil can in such cases be as easily used, and, as amalgam is objectionable on account of the color, it is decidedly better to use gold.

Dr. T. C. Stellwagen, of Philadelphia. It seems that our profession is deficient in one important point, the spirit of investigation. The result is that it is swayed, as Dr. Rich has shown us, and as we all know to be the case, by prejudices rather than judgment. I trust we will here learn something more than the fact that teeth ought to be occasionally filled with amalgam to preserve them; that hereafter, instead of traveling in a circle, forever returning to the same point, adhering blindly to old habits of practice, we may be guided by judgment, and advance in a straight line. The use of amalgam I have taught and advocated, having used it myself for fifteen years. During that time I am not only satisfied that I have saved teeth by its use that I could not otherwise, but that the nervous systems of my patients have suffered less.

Dentists have failed in not looking beyond the mechanical operation of filling teeth to ulterior effects. They have too often forgotten that the patients they were operating upon were living, breathing beings, with nervous systems. In consequence, more than one patient has been so completely prostrated by the insertion of a gold filling that ten times the price of the operation would not compensate for the injury done to the general system. We should never forget that we are physicians as well as dentists. When a filling has to be made with amalgam, of course it may be only temporary, but there are many times when patients apply to us that such a temporary filling is far better than a permanent one.

Dr. Geo. B. Snow, of Buffalo. I confess to have been brought up to regard amalgam as a material for filling teeth to be used with great distrust, and I have watched with surprise the change of opinion respecting it that has been taking place of late. I have tried some experiments in a crude way with American amalgams, and my samples, like those shown here in tubes, have always presented against the glass a more or less granulated surface after hardening. Specimens of Fletcher's amalgam which I have seen have presented a bright, mirror-like surface against the glass; something which I have never been able to attain in my experiments. It seems to me that there is a point here to guide us in the selection of a proper amalgam: that samples presenting this granulated surface after hardening must of necessity undergo a molecular change which will render impossible an absolute contact with the walls of the cavity, and consequently cause more or less leakage.

In Dr. Fletcher's directions for the use of his amalgams, he speaks of keeping the cavity of the tooth absolutely dry at the time of the insertion of the filling. He even goes so far as to say that it cannot be wiped out dry enough, and recommends the use of the hot-air syringe. He then recommends, if there is the least suspicion of moisture about the cavity, the use of some kind of varnish which will adhere to the tooth-substance, making the *joint*, as it were, between the filling and the wall of the cavity. I would inquire if any one here has any experience in the use of this process.

(To be continued.)

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

At a meeting of this association, Dr. G. W. Adams stated that some time ago he had inserted a set of teeth upon rubber base, in the mouth of a middle-aged lady, who was so sensitive that she could not wear them fifteen minutes without becoming nauseated; violent retching followed, and she was obliged to remove the teeth to get relief. Upon reinserting them, the same effect recurred,—and this had continued week after week. He had cut the plate off from time to time, so that it would not extend so far back, but without much apparent benefit.

The patient was of a nervous temperament and easily excited. Two years ago she was confined to her bed for many months with a spinal affection. Her health is now pretty good, but she is still weak and sensitive. At present she is wearing a small gutta-percha plate (without teeth on it), simply to try to become accustomed to a foreign substance in the mouth.

Dr. Spencer Roberts recommended that a gold plate be substituted for the rubber one.

Dr. E. R. Pettit thought these effects were sometimes the result of emotional causes; the *idea* alone of wearing artificial teeth would almost nauseate. When compelled to wear them, such persons should engage in some active duties, which would also keep the mind fully occupied, giving the thoughts no time to dwell upon the presence of the artificial denture. By this method, the patient would probably in a short time become accustomed to their presence. A strong effort of the will oftentimes overcomes these difficulties.

Prof. Truman thought these cases were altogether nervous, and that they can usually be overcome. Bromide of potassium had been recommended by some, but he doubted if any medication would answer.

The patient must get rid of the idea that the plate will nauseate her. Where obturators are to be worn, the mouth is often prepared for their reception by the use of a spoon or the finger, to accustom it to the presence of the foreign body.

He had made a plate for a clergyman, with whom he had great difficulty in procuring a good impression. The gentleman, also, had trouble for a long time in wearing the plate, but as it was a matter of necessity with him, he had persevered, and finally overcame the difficulty. He recommended a small plate, with the air-chamber away from the center of the mouth. The thickness and dryness of the rubber were objectionable; so he would prefer a metal plate.

(Dr. Adams has recently reported that his gutta-percha plate had a good effect; that, after wearing the soft plate about two weeks, a new set was made for her, upon a very small and thin plate of rubber, using small plain teeth, and leaving the molars off. She can wear this plate with much less inconvenience than the first one; still, they nauseate her occasionally.)

Dr. Williams exhibited and described his pneumatic mallet; discussion ensued as follows:

Prof. Buckingham. There is one advantage possessed by this mallet over the electric, and that is, that it is always in order. The construction is extremely simple: the only inconvenience is working with a treadle, which could be overcome by an assistant or other motive power. Many use the hand-mallet without assistance,—certainly this is much better, as it leaves the hands free.

Dr. Millard. I have tried the new mallet of S. S. White, and have packed a book and a half of gold with it. The principal objection that suggests itself is, that I think it will become tiresome in long operations. Patients prefer it to the hand-mallet, but they prefer the electro-magnetic to either.

Dr. Fouché inquired of Dr. Millard if he used the electric mallet in small proximal cavities; to which Dr. Millard replied that he always used it in condensing, but not always in commencing a filling.

Prof. Truman. There are some points that seem to require more careful consideration. There is a prevailing opinion that the mallet is indispensable to perfect operations, and results sustain this judgment. If thorough condensation is important in a filling, it can only be obtained by the application of a force that will overcome mobility. Weight will not accomplish this. The force applied in hand-pressure is distributed in such a manner that the effect is lost at the point of impact, and is imparted to the whole body. Weight, therefore, as we find it in hand-pressure, will not condense metal when the force is applied on a movable body. To overcome this, the blow must be applied with rapidity. Velocity combined with an increase of weight results in a momentum destructive in its character, and is not, therefore, adapted to the purposes of filling. Rapidity of motion will entirely overcome mobility, and cause perfect condensation at the point of impact. A light solid mallet is then more effective than a heavy one. This theory has been fully demonstrated by experiment. The electric mallet combines all these requirements. And in experiments carefully made to test this, it was demonstrated that fillings could be made with it as solid on a movable as on a hard base. It combines lightness, wonderful rapidity, and precision of movement. It is distinguished from other appliances by having a constant force of its own. Rapidity of movement is important in another respect. The constant application of blows, regularly applied, and with distinct intervals, becomes unbearable to the patient; but when these are increased to five hundred per minute, individuality is lost to the mind, and they become an almost continuous pressure. Hence the automatic plugger, while giving a good blow, is almost intolerable. It is doubtful whether "touch blows" will ever prove effective, but this will require further investigation.

Dr. Millard said he preferred "touch" to continuous blows.

Dr. Bonwill. There are differences in the character of the blows, which can be produced in various ways. This pneumatic mallet gives very good blows as far as it goes,—believe there is no force equivalent to electricity for this purpose. With the ordinary mallets, the blows are felt individually. Snow and Lewis's mallet is not as good as one with the spring behind. A spring coil gives a blow when weakest. A blow produced by a current of air cannot be so rapid. If you have rapidity, you cannot have length of stroke. A long blow, in long operations, will produce periosteal irritation. Electricity has no correlation of forces—the power is ahead of the mallet, and becomes greater as it approaches the magnet. The jar is not carried to the periosteum. We want the deadest blow possible. It is said the electric mallet is complicated and liable to get out of order; but it is not as complicated as the telegraph instrument. The only trouble is that men stand aloof, thinking they cannot learn about electricity.

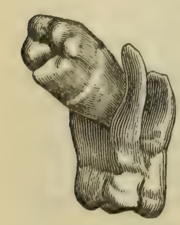
Prof. Buckingham. There seems to be a very wide difference of opinion in the profession. Some advocate a lively blow, choosing a well-tempered steel mallet; others prefer a dead blow, selecting a mallet of lead. The electric mallet has been improved, and the blow very much modified, so that it now gives more of a dead blow than at first. In regard to the rapidity of the blow, there is also difference of opinion. Mr. Leslie speaks about dentists hammering the life out of gold. Dr. Corydon Palmer objects to rapid blows, and says gold cannot be welded with them as well as with a heavy blow, consequently, he prefers a simple heavy blow. So far as the motive power is concerned, electricity does not go to the end of the plugger. The electric mallet is an instrument very few know how to work. The battery will get out of order in spite of you, and you cannot tell why. I took a piece of plate to an electro-gilder to have it gilded, and asked how soon it would be done. The man replied he might have it done the next day if his battery would work; and if it did not work, then he would have it done whenever it did. Here is an instance of persons who are daily using batteries; and they will get out of order, and they cannot tell where the fault is; and it is the same way with the battery of the electric mallet. In preparing for my course of lectures, I have often prepared my battery and found it would not work; have taken it apart and put it together again in precisely the same manner, and it would work all right, and I could not tell where the fault was. When the battery is at rest, it is not as good as when it is at work. This automatic mallet is always ready; you may leave it stand for months, and yet, when you want to use it, it is ready at once, which is not the case with the battery of the electric mallet. As I said before, the only difficulty is the motive-power to work the treadle.

Dr. Bonwill said that the batteries may be made to run all right with mechanical precision.

Prof. Truman. I have very great respect for the opinions of Dr. Corydon Palmer, but he certainly is mistaken if he asserted that rapid blows with a light mallet will not weld gold as perfectly as heavy and slow. The same amount of solidity may be obtained by the hand-mallet as one moved with the rapidity of the electric; but, if done, it must be by an adherence to the theory laid down in previous remarks.

Dr. Buckingham is undoubtedly correct in his statement that trouble will be experienced with batteries. They are liable to cease working in inopportune moments, and the cause is not readily discoverable.

Prof. Truman. I hold in my hand a specimen, given me by Dr. J. W. White, and presented to him by Mr. Frank H. Brimmer, of Ellsworth, Maine, which, while it is interesting, is not an uncommon occurrence. It is the union of the wisdom-tooth with the second molar of the right side of the upper jaw. The roots of the dens sapientiæ are united to the palatine root, the crown passing backward. In this case, development has taken place in an abnormal position, and the roots have subsequently united by a deposition of cemental tissue. I have a number of specimens that represent nearly the same malformation. A distinction must be drawn between this character of union and that where the teeth have been connected from the earliest periods of development. In the latter case there is a union of dentine, and frequently but one



pulp supplies internal nutrition. Several specimens indicate this very clearly.

The malposition of the wisdom-tooth is a subject of vital importance in its pathological relations. Its abnormal development is a prolific cause of facial neuralgia, and cannot be too thoughtfully studied.

JOSEPH PETTIT, *Secretary.*

FIRST JUDICIAL DISTRICT DENTAL SOCIETY.

REPORTED BY F. M. ODELL, D.D.S.

AT a regular meeting, held March 2d, 1875, at the office of Dr. William H. Atkinson, the president, Dr. R. M. Gage, in the chair, the subject appointed for consideration being "Diseases of the Antrum and Maxillary Bones"; an able essay upon that subject was read by Dr. J. R. Goble.

A communication from Dr. James R. Wood was read, expressing regret that at the last moment his duties had prevented his being present with a number of highly interesting specimens, which, however, he would be pleased to exhibit at a future time, when the society might honor him with an invitation.

The discussion was opened by Dr. C. P. Fitch, who said: I have very little experience in the treatment of antral diseases; have had more in dealing with alveolar troubles; have nothing new to offer, either in reference to the causes or treatment of diseases of the antrum. The ground has been well gone over by the essayist of the evening, as may be found by consulting the different authors upon this subject. Diseases of the roots of the teeth are a frequent, as well as prolific, source of antral troubles. Diseases attacking this cavity are more difficult to reach, but not more difficult of treatment, than lesions of the mucous surfaces of the mouth. The fact that this cavity is concealed from view, and more difficult to reach, complicates matters a little, and renders medical interference more difficult; yet mucous surfaces of this cavity, when diseased, yield as readily to proper medication as do other diseased mucous surfaces. Treatment here is very apt to be too heroic; disease is produced, rather than arrested. In reference to medication, it is a great thing to know when to do, how much to do, and when to stop doing. As with abscesses, so with antral difficulties, much harm is done by over-treatment. It is the province of the discreet surgeon, however, to determine when to interfere, and the degree of medication necessary. Unassisted nature, sometimes, is the better doctor, and the surgeon should be careful that his officiousness contravenes none of her laws. Nature should be assisted in the removal of carious or necrosed bone by instrumental means as well as medication.

I believe here in cutting more than in trusting to nature, and yet final restoration must come from nature, under the guiding influence of a wise and gentle therapia.

Remove the cause of disease, and nature will effect a cure in every case, and this should be the rule of treatment.

Dr. Goble fully agreed with Dr. Fitch, that, in the treatment of all diseases, we should first remove the cause. But I do not propose to wait too long to let nature take care of herself, I propose to help her a little; but I do not approve of removing the necrosed bone with the chisel and saw. . . . Remember a case which we had in the General Hospital in ——, Missouri, of a soldier, whose toe was removed at the metatarsal joint, the disease breaking out again at the ankle, and afterward at the knee, and being arrested only after the third amputation. I believe in assisting nature by opening the tumor, then giving a tonic treatment until a line of demarkation is set up, then cutting, if necessary; but first let nature help herself.

Dr. Fitch said: I did not, in my remarks, say anything about the chisel and hammer; but, nevertheless, I have seen them used with beneficial effects. I wish to lay down one general principle: all there is in disease any way, is a perversion of nutritive function. Nutrition may be interfered with all over the body or locally. If a man is full of poisons from the *débris* of the system, when he meets with an accident of any kind it will be very difficult of treatment.

I do not know that it is the business of dentists to treat these diseases, as this necessitates, in many instances, the treatment of the entire system. I hold this, that a man to treat cases in any department successfully, wants cases all the time in that department; this must be the case, in order to become an expert in any department of medical or dental practice.

Our principles may be right, but our practice may be very poor.

Dr. John Allen said: I have not found diseases of the antrum so very difficult to treat. It is simply to cleanse thoroughly, wash out thoroughly with warm water, and then follow with proper treatment, such as a wash of dilute creasote, or similar substances, to produce a healthy action. Opening into the antrum I do not regard as an operation which is so very formidable; it seems so to the patient, but it is not; it does not give a great deal of pain to open into the antrum, and I find that the disease always yields readily to the ordinary remedies. In these cases, where there is a great secretion of matter, it is well to have the antrum cleaned out every day, or there will be secretions which will give great pain. I have seen cases in which there would be quantities of matter thrown out through the nose; but we have simply to wash it out thoroughly, and daily, for a while, until naturally the disease ceases.

Dr. Goble. Did not so much refer to Dr. Fitch, in my remarks concerning the hammer and chisel, but rather to the use made of them by surgeons; and particularly in such examples as the evacuation of a tumor by opening in the frontal bone, and taking therefrom at the rate of two ounces per day. I have known the medical profession very willing to have us trespass upon their grounds in these cases; quite as willing as we were to do it. Dental surgeons should know how to take hold of and treat every disease of the mouth. Hoped the time will soon come when every man who practices dentistry will be prepared to treat such diseases.

Dr. William H. Atkinson said: You all know (who are at all familiar with my views) that I assume that he is not a competent dentist who is not a surgeon also; he exercises the functions of a surgeon every time he performs the simplest operation of treatment. I am sick and tired of these differences being all the time obtruded in our faces.

The subject is so immensely large that it is impossible for us to make any progress in evolving all the points in the question. The trouble frequently is that if we assume to treat derangements of function from a view of one or two aspects, and not the whole range of the aberrant career (which is necessary to a correct diagnosis, prognosis, and treatment), it may result in every possible divergence.

The regular course of treatment, in every particular case, is, in the main, where bones are necrosed, according to the advice of all the older authorities, to wait until a line of demarkation is set up between the diseased and the healthy tissue. A more damnable doctrine was never announced!

All healthy tissue, when cut, heals by first intention if supplied with healthy pabulum. But how many men are in that condition of the system of proper rest and proper feeding to entitle them to be regarded as in full health? Obstruction of nutrition lays the foundation of every variety of aberrance of function or pathological action. Necrosis is the result of arrest of pabulum from going into the tissues; the coagulation of the blood-column, and the disintegration of the pabulum, prevent the nutrient supply entering the bone-cell territories; and this will indicate the manner in which to treat.

We often hear dentists say that mephitic gases are generated there. The gases are the result of the dissociation of the elements of the pabulum. There is no local disease without constitutional degeneration of pabulum. The greatest difficulty is that we do not see the cases soon enough. How are we to judge if we are going to cut? If we attempt to cut, we should make free incisions through the soft parts into the bone, across the line separating the healthy from the diseased tissue, on all sides of the congested portion. . . . Surgery is a department of medicine. Medicine is a department of natural history.

Dr. John Allen said: The dentist should be thorough in his education in everything which pertains to the mouth. . . . I know of several dentists who became the most expert operators in surgery.

Dr. Fitch said: Dr. Atkinson in dogmatizing said, "There is no disease without degeneracy of tissue." I wish to add another aphorism: "There is no degeneracy of tissue without a perversion of nutrition." Nutrition is composed of two acts: the supply of aliment, and the removal of the *débris* of the organism.

In necrosis of bone, I do not like expectant treatment; have known of such cases of from six to twenty years' standing. I would use mild, and, if necessary, heroic treatment. Would not like to trust altogether to the expectant mode of treatment, as is sometimes done.

The Clinic Committee reported the afternoon's work a success.

One hundred and thirty-five persons present.

The occasion was rendered interesting by the exhibition of a case of malignant ulceration, with diseased palatal bone; in addition to the efforts of five clinical lecturers, viz., Dr. Charles Wheeler, of Albany, who used the new automatic mallet, driven by White's dental engine; Drs. Goble and Hanks, of New Jersey, who operated in the usual manner; Mr. I. S. Hyatt and Dr. A. P. Southwick, who demonstrated and explained the manipulation and properties of celluloid.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.

REPORTED BY L. ASHLEY FAUGHT.

THE regular meeting of the society was held, on December 2d, 1874, at the Philadelphia Dental College; the president, Dr. Louis Jack, in the chair.

Dr. Nones showed a central incisor, which gave apparent signs of dilaceration previous to complete formation. The child from whose mouth it had been extracted had had a fall; and the deciduous tooth must have been forced against the permanent, giving it the appearance of being bent inward about five-eighths of an inch.

Dr. Wert exhibited a specimen of dilaceration in a central incisor. In examining the mouth he found the tooth had grown between the lip and the ridge. He found it very difficult to extract.

Dr. McQuillen then presented, at the request of Dr. Mordaunt Stevens, of Paris, France, a magazine, entitled *Le Progrès Dentaire*, and then nominated that gentleman as a corresponding member. He then exhibited a perfect skull of a beaver; also read a letter from Dr. Allen, of New York, who had sent a tooth accompanying it, the history of which was as follows: "Five years ago last August, a young patient of mine,—a miss of some ten summers,—in playing with her companions, was thrown violently against a post, knocking out the tooth and fracturing it. Nearly an hour afterwards, according to her mother's story, her mother picked it up, and, without washing or wiping, placed it in the bleeding socket. Then, as she was not aware of my being in the city, she took the child to another dentist. The advice given her was "to leave it alone and feed the child on soft diet." This she did for a week. She then brought the child to me, and on examination I found the tooth held by slight attachments, the gums and surrounding parts much swollen and tumefied. I changed the diet to a stimulating one, and cleaned the root as carefully as possible with fine scalers, etc., tied it to its neighbors, and reduced the swelling by local applications and bleeding. About two weeks afterwards, while feeling for grains of sand, I dislodged the tooth. After carefully swabbing out the socket and cleaning the tooth, I replaced it, and repeated my former steps, and in two weeks more the tooth was quite firm in its socket. Treatment was then stopped, and until last May the tooth was more or less under my observation When she presented herself about May last, I at once saw that the game was up. I made an early appointment, and extracted it. I feared necrosis of the bone might set in, but my fears were groundless."

Dr. Stellwagen said he had used for some months the improved electric mallet, donated to the society by Dr. Jack, and found it excelled everything else of the kind. He wished the society to take some action upon the gift, as it was one as remarkable for its unconditional generosity as for its intrinsic worth.

After some discussion, the committee which at a former meeting was appointed to receive the mallet was instructed to prepare a suitable testimonial.

Dr. Stellwagen also desired to obtain from the society any information bearing upon the correlation of dental and mental irregularities. Through the courtesy of Dr. Kerlin, the speaker had enjoyed the opportunity of making some examinations in the Pennsylvania training-school for feeble-minded children, but found nothing remarkable, excepting the general neglect of cleanliness of the mouth, such as one might naturally expect in cases where the patients were of similar mental weakness. Some of the teeth were irregular, and the incisors more or less missing, probably due to the breaking of them out by the patients themselves. The arches were rather broader in some than is usual, as Dr. J. W. White had previously reported.

Dr. S. S. Nones said he found the teeth generally good in idiots, but had noticed that their mouths were exceedingly dry in quite a number of cases. Dr. McQuillen had examined blood for him, taken from those who were insane. He, however, noticed nothing peculiar in the corpuscles. Some of them had been placed under the influence of ether, chloroform, and nitrous oxide gas, but this did not seem to produce any change in the characteristics of the blood.

Dr. Stellwagen asked if any one had noticed that where the hair was abundant the teeth were more or less defective.

Dr. Nones said that he had examined the "bearded lady" at one time, and noticed she had very defective teeth.

Adjourned.

OHIO COLLEGE OF DENTAL SURGERY.

The twenty-ninth annual commencement of the Ohio College of Dental Surgery was held in the lecture hall of the college, Cincinnati, March 4th, 1875.

The annual address was delivered by Dr. Joseph Richardson, Terre Haute, Indiana.

The valedictory, on behalf of the class, was delivered by W. A. Spaulding, Minnesota.

The number of matriculates was twenty-four.

The degree of D.D.S. was conferred upon the following graduates by Dr. James Taylor, President of the Board of Trustees:

NAME.	RESIDENCE.	THESIS.
W. A. Spaulding	Minnesota	Artificial Dentures.
C. E. Case	Ohio	Galvanism of the Mouth.
A. M. Callaham	Kansas	Filling Teeth.
C. B. Mower	Ohio	Dental Practice.
F. W. Stewart	Ohio	Dental Education.
D. S. Dibble	Kentucky	Dentistry Proper.

MISSOURI DENTAL COLLEGE.

The ninth annual commencement of the Missouri Dental College was held in Temple Building, St. Louis, on Friday, March 12th, 1875.

The valedictory address was delivered by Prof. G. Baumgarten.

The degree of D.D.S. was conferred upon the following graduates by Prof. J. T. Hodgen:

NAME.	RESIDENCE.	THESIS.
J. C. McCoy	Missouri	Nutrition of the Dental Tissues.
R. G. Berry	Illinois	Diseases of the Pulp.
E. K. Blair	Missouri	Fractures of the Inferior Maxilla.
N. C. Stark	Missouri	Diseases of the Dental Pulp.
J. W. Whipple	Virginia	Operative Dentistry.
E. B. Loomis	Illinois	Alveolar Periostitis.

NEW ORLEANS DENTAL COLLEGE.

We are informed by Prof. J. S. Knapp, Dean of the New Orleans Dental College, that notwithstanding the general stringency of the times and the unsettled state of political affairs in Louisiana, which interfered alike with all interests, educational, agricultural, and mechanical, the clinics and lectures at the college were continued as usual, and without any commencement exercises the degree of D.D.S. was conferred upon C. Chauncey Marshall, of Mississippi. Thesis, Irregularities of the Human Teeth.

MARYLAND DENTAL COLLEGE.

In the report of the commencement of this institution in the Dental Cosmos, April, 1875, the number of matriculates was incorrectly stated as twenty-four. The number was seven.

DENTAL ALUMNI ASSOCIATION OF MARYLAND DENTAL COLLEGE.

At the annual meeting of the Alumni of the Maryland Dental College, the following officers were elected:

President.—Dr. Frederick A. Levy, of New York.
Vice-President.—Dr. T. W. Coyle, of Maryland.
Treasurer.—Dr. J. Emory Scott, of Maryland.
Corresponding Secretary.—Dr. Charles E. Duck, of Maryland.
Recording Secretary.—Dr. Frederick F. Drew, of Maryland.

ILLINOIS STATE DENTAL SOCIETY.

The Eleventh Annual Session of the Illinois State Dental Society will be held on Tuesday, May 11th, and succeeding days, at Ottawa. A cordial invitation to be present is extended to all progressive dentists.

Charles R. E. Koch, *Secretary.*

PERISCOPE.

The Leverage of the Lower Human Jaw.—(An excerpt from the author's note-book.) *Anatomy and Mechanism of the Lower Jaw-Bone.*—(Concluded from p. 216.) The lower jaw, represented in profile (Fig. 1), consists of a horizontal portion containing the lower teeth, and an upright or ascending portion terminating in the joint. These portions are named respectively the "horizontal" and "ascending" ramus of each side, the chin being considered as placed between them in front. The ascending ramus terminates above and behind in a thickened process termed the "condyle," and constituting the articular portion of this bone. The angle formed by the commencement of the horizontal ramus is termed the "angle" of the jaw. Although several muscles are employed in the movements of the lower jaw,—such as the two pterygoids, the buccinator, the masseter, and the temporal,—it is to the two latter that its elevation is chiefly due. The concentrated effect of these two muscles is located in a line a little behind the coronoid process of the jaw, the precise position of which it is of some importance to notice, as it defines the point of power in the lever-rod, from which is calculated its short arm.

FIG. 1.

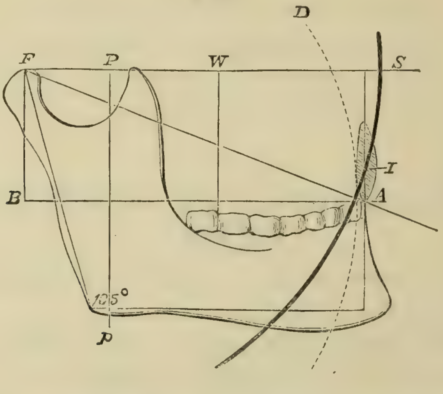


FIG. 1.—Right half of lower jaw-bone with its complement of eight teeth. *F*, Condyle—*i.e.*, position of fulcrum. *p*, Anatomical angle of jaw. *P*, Point of power. *W*, Point of weight—a line let fall perpendicularly to a point between two posterior molars. *FW*, True lever-rod, regardless of bend of jaw at *p*. *SS'*, Circular path of lower anterior incisors on a radius *FA*, showing that they move forwards and upwards until they impinge on upper incisors *I*. *DD'*, Circular path of lower anterior incisors, on a radius *BA*, showing that they move upwards and backwards after impinging on upper incisors *I*: supposing the condyle to be at *B*—that is, in a line with the lower teeth, as in the tiger, cat, etc.

The lever (see Fig. 1) is here bent in its form for the purpose of convenience; but, whatever be the form of the lever, the mechanical advantage of the power or the weight is always represented by a line drawn from the fulcrum at right angles to the direction in which the forces are respectively exerted.

Fig. 1 is a bent lever, exemplified in the case of the lower jaw with the power *P*, acting in the line *Pp*, and the weight *C* (Fig. 2), at the center of gravity, acting at *W* (Fig. 1), while the fulcrum is at *F*. In this case both the power and the weight act at right angles to an ideal line drawn as from *F* to *W* across from the fulcrum to the weight which strikes the line of direction of the forces at right angles. This ideal line, *FW*, therefore, represents the true lever of calculation, and is proceeded with according to the ordinary rule for calculating lever powers. In this manner the bending which takes place at the angle goes for nothing.

In order to arrive at legitimate results it is essential that the anatomical points should be very accurately measured on the jaw itself, and it is equally essential that their distances be as carefully measured on the lever-rod: a slight mistake in either of these particulars would lead to error. The shifting of the point of power or the point of weight, even only the one-tenth of an inch, would so modify the answer—*i.e.*, the power in grains required to elevate the lower jaw by lever-force—as to render the calculation useless.

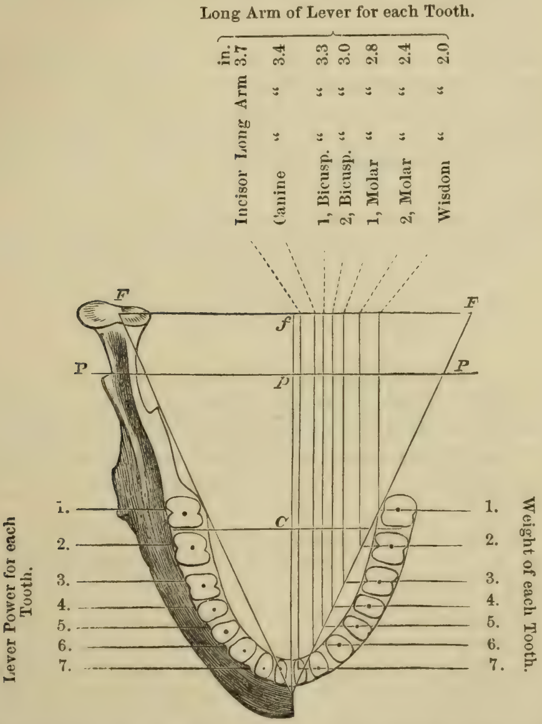
1. The *rod* itself is a line drawn from the fulcrum, *F*, to the point of weight, *W* (Fig. 1).

2. The *fulcrum* is a line drawn from condyle to condyle (Fig. 2), and is taken at *f* midway between the two.

3. The point of *power*, *P*, is in a line stretched horizontally from the coronoid process to the condyle, and one-third of the distance from the former to the latter process. This point is 0.7 of an inch from the fulcrum *FP*, (Fig. 1) and *fp* (Fig. 2).

4. The point of *weight*, *W* (Fig. 1), is the center of a line passing through the center of gravity.

FIG. 2.



Lever Power (in grains) for each Tooth.	
1. Wisdom	90.915
2. Molar, posterior	112.808
3. " anterior	129.600
4. Bicuspid, posterior	62.488
5. " anterior	68.380
6. Canine	86.815
7. Incisor	57.024

Weight (in grains) of each Tooth.	
1. Wisdom	31.9
2. Second Molar	32.4
3. First Molar	32.4
4. Second Bicuspid	14.6
5. First Bicuspid	14.6
6. Canine	17.9
7. Incisor	10.8

FIG. 2.—*FF*, Fulcrum of jaw. *f*, Lever fulcrum of all the teeth. *fp*, Short arm of lever for all the teeth. *fC*, Long arm of the lever of the lower jaw itself, extending from fulcrum *f* to center of gravity *C*. *P*, Point of power found by drawing a line a little behind the coronoid process on either side. *C*, Center of gravity of lower jaw. The *weight* of each tooth is shown in the references to the figures in the right column, the *long arm* of the lever at the top of the illustration, while the *short arm* is the measure from *f* to *p*. These three form the data for finding the power by the formula $P = \frac{W \times L}{S}$, and this gives the measure (in grains) for lifting each tooth, as shown in the left-hand column.

5. The *center of gravity*, C (Fig. 2), is found by stretching a thread across from side to side, either in front of the alveoli of the wisdom-teeth, or across the center of the alveoli of the posterior molars. Owing to the variable thickness of this bone, especially about its symphysis, its center of gravity varies. The thread must be shifted therefore forwards or backwards, until, when poised on the finger or suspended from its middle by a second thread, the bone hangs horizontally. The center of gravity, C, is thus determined for each individual jaw, and is about 2.2 inches from the fulcrum.

6. The *long arm* of the lever is a line drawn from the fulcrum, F (Fig. 1), to the center of gravity C, and is = 2.2 inches.

7. The *short arm* of the lever is a line drawn from the fulcrum, f, to the point of power, p (Fig. 2), and is equal to 0.7 of an inch.

8. The *weight of the toothless jaw* may be assumed as equal to about 960 grains.

If the letters W, S, L represent the weight, the short arm, and the long arm of the lever respectively, the power, P, is found by the formula—

$$P = \frac{W \times L}{S} = \frac{960 \times 2{\cdot}2}{{\cdot}7} = 3017 \text{ grains.}$$

In this way the disadvantage of this kind of lever, as well as the measure, are strictly defined, for the muscles have to exercise a force more than three times as great as that which has to be overcome, being in the proportion of two ounces (*i.e.*, the weight of the jaw) to six ounces and a quarter (*i e.*, the power required to raise it); or, strictly speaking, as 1 : 3.14.

Of the Lever Power required to raise the Lower Jaw with its full complement of Teeth.—The mean weight of the whole of the teeth in the lower jaw is 330 grains.

A line from condyle to condyle, FF (Fig. 2), is the common fulcrum about which every tooth revolves in the act of mastication.

The teeth have different weights, and are set in the jaw at different distances from the fulcrum. Each tooth, therefore, has a lever-rod of its own, and travels in the arc of its own circle, and every tooth moves over equal arcs of different circles.

The fulcrum of the lever which raises each tooth is a point in the line FF (Fig. 2), exactly opposite the tooth. The long arm is a line drawn from the tooth, meeting its axis, FF, at right angles. The short arm is measured from the point p, where the muscular force is concentrated. The distance from p to the fulcrum, therefore, is the length of the short arm.

The lengths of the fulcrum and of the short arm are constant, and the same for every tooth; but the length of the long arm varies with the distance of each tooth from its axis, being greatest for the incisors and least for the wisdom-teeth.

The planes in which the teeth revolve are vertical. No two teeth revolve in the same plane, but each in an imaginary vertical plane of its own, of which the outermost is that of the wisdom and the innermost that of the anterior incisor. Their fulcra, therefore, are separate and adjacent points in the line FF (Fig. 2), from which lines drawn at right angles to their respective teeth represent the true lever-rods.

Each tooth has its own system of leverage, and requires a different power to raise it. If each had the same weight it would still require a different power, owing to its distance from its own proper fulcrum; and if the long arm of the lever were the same for each tooth, the power to raise it must still vary, owing to the difference in its weight. In either case, therefore, a separate calculation is required to find the lever power to raise each individual tooth. Again, although all the teeth move together in their respective arcs, it is still necessary to consider them at first separately, in order afterwards to calculate the leverage of the sum of all of them.*

The true method of calculating the leverage of the teeth will be to estimate the power required to elevate each tooth according to its weight and position, and then to add all the powers together, the sum of which will be the total power expended in raising all of them. A lower incisor, for instance, weighs about ten grains, and requires, from its position, a power of five times ten, or fifty, to lift it. A lower wisdom weighs about thirty-one grains, and requires a power of 31 multiplied by 2.58, or nearly ninety grains, to raise it,—and so for the rest.

Let the weight, long arm, and short arm be represented by the letters *W*, *L*, and *S* respectively, the power, *P*, is found by the formula—

$$P = \frac{W \times L}{S}$$

A lower incisor, for instance, weighs 10.8 grains, its long arm = 3.7 inches, and its short arm = 0.7 of an inch. Then—

$$P = \frac{10.8 \times 3.7}{.7} = 57.08 \text{ grains.}$$

Table showing the Weight, Long Arm, and Short Arm of each Tooth in the Lower Jaw.

Name of Tooth.	Weight in grains.	Length of Long Arm in inches.	Length of Short Arm.
Incisor	10.8	3.7	0.7
Canine	17.9	3.4	0.7
First Bicuspid	14.6	3.3	0.7
Second Bicuspid	14.6	3.0	0.7
First Molar	32.4	2.8	0.7
Second Molar	32.4	2.4	0·7
Wisdom	31.9	2.0	0.7

The product of the weight and the long arm is the moment of that arm. If, now, the moments are found for all the teeth, and the sum of them divided by the short arm, which is common to them all, the quotient is the power required to raise all the teeth together, as in the following table:

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* While the teeth actually travel in arcs, the radii of which are lines drawn from the condyles to their respective teeth, these radii are distinct from those belonging to the lever-lines of calculation. It is essential to notice this. The practical radius of an anterior incisor, for instance, is the hypothenuse, *F A*, of the triangle *F A B* (Fig. 1); but the lever radius is the base line, *A B*, of the same triangle—that is, has the same magnitude.

Table showing the Power required to Elevate all the Teeth in the Lower Jaw.

Name of Tooth.	Weight of Tooth multiplied into its Long Arm.		Moment of Long Arm.		Number of Teeth in each group.		Sum of Moments of Long Arm in each group.
Incisor	10.8 × 3.7	=	39.96	×	4	=	159.84
Canine	17.9 × 3.4	=	60.86	×	2	=	121.72
First Bicuspid	14.6 × 3.3	=	48.18	×	2	=	96.36
Second Bicuspid	14.6 × 3.0	=	43.80	×	2	=	87.60
First Molar	32.4 × 2.8	=	90.72	×	2	=	181.44
Second Molar	32.4 × 2.4	=	77.76	×	2	=	155.52
Wisdom	31.9 × 2.0	=	63.80	×	2	=	127.60
			Sum of Moments			=	930.08

and 930.08 ÷ .7 = 1328.68 grains.
Hence power to raise the jaw = 3017.00 grains.
" " " teeth = 1328.68 "

The lever power required to elevate the jaw, therefore, with its full complement of teeth, is 3017+1328.68, or 4345.68 grs.

In following out the argument, let it now be supposed, in the next place, that for the lighter teeth in the lower jaw there be substituted the heavier teeth properly belonging to the upper. With this additional weight thus imposed on the lower jaw, the question is, What further disadvantage is likely to accrue as to the lever power,—what additional force, in other words, will be required to raise it? This is easily ascertained by assuming the lower teeth to weigh as much as the upper—tooth for tooth,—and by calculating the additional power required to raise each of them respectively, and then the sum of them, as in the following table:

Table showing the Lever Power required to Lift the Teeth in the Lower Jaw, supposing that their Weight were equal to those in the Upper.

Name of Tooth.	Weight of Tooth multiplied into its Long Arm.		Moment of Long Arm.		Number of Teeth in each group.		Sum of Moments of Long Arm in each group.
Incisor	16.4 × 3.7	=	60.68	×	4	=	242.72
Canine	21.4 × 3.4	=	72.76	×	2	=	145.52
First Bicuspid	16.0 × 3.3	=	52.80	×	2	=	105.60
Second Bicuspid	16.0 × 3.0	=	48.00	×	2	=	96.00
First Molar	33.4 × 2.8	=	93.52	×	2	=	187.04
Second Molar	33.4 × 2.4	=	80.16	×	2	=	160.32
Wisdom	32.0 × 2.0	=	64.00	×	2	=	128.00
							1065.20

and $\frac{1065.20}{.7} = 1521.71$ grains.

Now, 1521.71 — 1328.68 = 193.03, making an extra demand upon the lever of nearly 200 grains, by calculating the lower teeth as if they were as heavy as the upper.

It was proposed, in the third and last place, to compare the leverage of the teeth set in their natural or orthodox position in the jaw with the force required to raise them, supposing that their natural order were reversed,—the front teeth taking the place of the back, and *vice versa,* regularly throughout the series. The additional power required in this assumed and unnatural position is shown in the following table:

Table of the Leverage of the Lower Jaw, supposing that the Natural Order of Position of the Teeth were Reversed.

Name of Tooth.	Weight of Tooth multiplied into its Long Arm.	Moment of Long Arm.	Sum of Moments of Long Arm in each group.
Wisdom (*vice* anterior Incisor)	32.0 × 3.7 =	118 40 × 2 =	236.80
Posterior or second Molar (*vice* lateral Incisor)	33.4 × 3.7 =	123.58 × 2 =	247.16
Anterior Molar (*vice* Canine)	33.4 × 3.4 =	113.56 × 2 =	227.12
Second Bicuspid (*vice* first ditto)	16.0 × 3.3 =	52.80 × 2 =	105.60
First Bicuspid (*vice* second ditto)	16.0 × 3.0 =	48.00 × 2 =	96.00
Canine (*vice* second Molar)	21.4 × 2.8 =	59 92 × 2 =	119.84
Incisor, lateral (*vice* first Molar)	16.4 × 2.4 =	39.36 × 2 =	78.72
Incisor, anterior (*vice* Wisdom)	16.4 × 2.0 =	32.80 × 2 =	65 60
		Sum of Moments =	1166.84

$$\frac{\text{Sum of moments of long arm} = 1166.84}{\text{Moments of short arm} = .7} = 1666.91 \text{ grains.}$$

Now, 1521.71 — 1328.68 = 193.03: showing an extra demand of nearly 200 grains by calculating the lower teeth as if they were as heavy as the upper. Hence with each rearrangement of the teeth the tax imposed on the leverage is only increased as might be anticipated. The conclusion is inevitable that on the whole, and independently of the necessity for their occupying their respective normal places as masticating organs, the order of their arrangement with respect to lightening the weight to be raised by lever power could not be altered for the better, but only for the worse. To pursue the inquiry further in this direction would be unprofitable. Sufficient has been adduced to show the futility of attempting to remodel any portion of an edifice constructed by the Divine Artificer, for human ingenuity may tax itself to the utmost in order to devise another plan by which the teeth may be arranged in the lower jaw in order to lighten its leverage, and come to the conclusion that, after all, their present arrangement is the best and the wisest that could be devised.—*John Gorham, M.R.C.S., Eng., in Medical Times and Gazette.*

ALLEN ON THE ANATOMY OF THE FACIAL REGION.*—We have to thank Dr. Allen for a valuable contribution to English anatomical literature. The book presents little that is original, but is none the less a valuable as well as an interesting treatise on the topographical anatomy of the face. The work is a collection "of jottings from lectures delivered to successive classes of dental students," but is as well or better fitted for the wants of the surgeon. It is very much to be desired that dentists should have some idea of the anatomy and physiology of the parts surrounding the organs with which it is their special province to deal, so that they may be aware of accidents likely to occur, and may know when to send a patient to a surgeon. It might be said that the range of the book is more extensive than it need be for merely dental requirements, but the error, if it be one, is on the right side. The style is easy and clear, the dryness of anatomical details being frequently relieved by accounts of striking cases of injury to the parts in question and of operations for their relief. In this respect the book reminds us of Hyrtl's Topographical Anatomy, to which the author frequently refers.

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* Studies on the Facial Region. By Harrison Allen, M.D., Professor of Anatomy and Surgery at the Philadelphia Dental College. Philadelphia: J. B. Lippincott & Co. 1875. Pages 117.

There is so much to praise that we were absolutely startled by the author's remarks on the action of the external pterygoid muscle. He writes, "The actions of the pterygoids are complicated. The massive internal pterygoid and the masseter act together in directly raising the lower jaw. But before it can do this, the condyloid process, which has been tilted out of the glenoid fossa, must be replaced. This is done by the external pterygoid; the larger slip operating on the jaw, the lesser one adjusting the capsule and the inter-articular disk. The external pterygoid holds to the temporo-maxillary articulation the same relation held by the popliteal muscle to the knee-joint." We were hardly prepared to see accepted views overthrown without even an allusion to their existence. The action of the external pterygoid is, if both be acting, to draw the condyles and inter-articular cartilages forward, a preparatory step towards opening the mouth; or, if one act alone, to draw these parts forward and inward. We cannot give up these views without some reason for so doing. We see no mention of the action of the digastric, which is of some importance in this relation. The remarks on the lower jaw are excellent, as is also the description of the oral cavity and pharynx. We reserve for another occasion the discussion of Dr. Allen's very interesting observations on the nomenclature of teeth.—*T. D., Jr., in Boston Medical and Surgical Journal.*

EFFECTS OF MECHANICAL IRRITANTS UPON THE STRUCTURES OF THE MOUTH.—. . . In children the necrosed roots of the temporary teeth, in the effort of nature to throw them off, are frequently found with the sharp apices of the fangs protruding into the cheek, where extensive ulceration is set up. In ill-fed or scrofulous children the sore may assume a foul and unhealthy character. The first step in the treatment is, of course, the removal of the offending teeth, and a lotion of chlorate of potash and borax should be ordered; if the child is in an unhealthy condition, strengthening remedies will tend to hasten recovery. A rather curious case, illustrative of this, came under my notice last month, in which the roots of the two temporary upper central incisors were finding their way out, their apices having pierced the anterior surface of the gum high up in the alveolus, in fact, almost at the point where the mucous membrane folds over from the gum to the inner surface of the upper lip. The consequence of this state of affairs was a most unhealthy-looking ulcerated surface, covered with a yellowish slough, stretching along the whole inner surface of the upper lip. The roots were immediately removed, and chlorate of potash was ordered to be taken internally in three-grain doses three times a day. These ulcers, if neglected, may cicatrize over in such a manner as to bind down the cheek to the alveolus, tough fibrous bands being formed which interfere slightly with the action of the jaws, simulating in a modified degree the dense cicatrices resulting from stomatitis.

. . . Distressing consequences arising from the irritating effects of elastic bands employed for the purpose of regulating teeth are frequently met with. In one case which I witnessed, the band in an incredibly short time slipped up nearly to the apices of the fangs of the central incisors, proving a source of the most acute suffering to the little patient.

It was fortunately removed, although with considerable difficulty, and the teeth thus rescued, but permanently weakened. In another case, of which I have seen the model, the central and lateral incisors of one side were lost under similar circumstances. Although in many cases undoubtedly useful, great care and judgment should be exercised in the use of these bands. Frequently they do their work so quickly that severe periostitis is set up, and no time is allowed for the formation of new bone, whereby the tooth is to be retained in its new position.—*D. Hepburn, Jr., L.D.S., Reports Odonto-Chirurgical Society, in British Journal of Dental Science.*

Cases in Practice.—Mr. B. Hammond then read the following notes:—A boy, aged fourteen, came to me with face much swollen on right side, extending down to the glands of the neck. He complained of great soreness on opening the mouth, and was evidently suffering a good deal of pain. On examination I found all the teeth perfectly sound, but a quantity of pus welling up from a large abscess situated posterior to the second molar, which tooth was quite loose, and almost hidden by the swelling. I probed the abscess, but could discover nothing to account for the irritation, and had the patient been older I should certainly have suspected something wrong with the wisdom-tooth. I then remembered a somewhat similar case, which came before me some three or four years ago,—that of a lady, who had a very sore mouth, caused by biting a fish-bone, up between her teeth. However, this patient said he never ate fish. So I searched again with the probe, and at length felt distinctly something loose deeply imbedded and lying obliquely behind the second molar. I extracted this, and it turned out to be part of the rib, about half an inch long, of a rabbit which he had eaten on the Sunday previously. I recommended warm water to be held in the mouth, and saw the patient next day. The swelling had somewhat subsided, but the tooth was still loose. I then painted the right side of the gum with ℞ tinct. iodi, tinct. aconiti, āā, for three successive days, when the tooth became quite firm, and patient well: thus saving a tooth which, in all probability, might have been extracted, patient having come to me for that purpose.

Mr. David Hepburn. A remarkable case, illustrative of the evil results which may be brought about by the presence in the mouth of foreign bodies, had come under his notice. About a year ago a patient applied at the Middlesex Hospital, having a tumor of considerable dimensions in the right submaxillary region. From the patient's history, nothing could be gleaned as to its nature; it was, however, deemed expedient to remove it, and an operation was performed. Mr. Hulke, under whose care the patient was, made an incision about two inches and a half long in the region of the tumor, and, after a lengthy and careful dissection, came down upon a hard body, which was at first mistaken for one of the cornua of the hyoid bone; it, however, turned out to be a large calculus formed in the substance of the submaxillary gland, and was accordingly removed. Afterwards, when the calculus was divided, in its center was found a small splinter of wood, which, by some means or other, had found its way into the gland, and had there formed the nucleus for the deposition of the calcareous salts.—*Report Dental Student's Society, in Monthly Review.*

DELETERIOUS RESULTS FROM WEARING ARTIFICIAL TEETH UPON RUBBER BASE.—*Case* 1.—Mrs. B. consulted me, May 7th, 1874. Native of United States; aged forty-three; married second time. States that she has been sick, or feeling miserable, for over six months; has been under treatment of another regular physician during that time. Head-symptoms: occasional dizziness and confusion of ideas, and sluggishness of the memory; restlessness, and inability to obtain refreshing sleep at night; depression of spirits. Eyes: dimness of vision, muscæ volitantes, photophobia, increased lachrymation; pain, deep-seated; from the iritis present, could not obtain a satisfactory ophthalmoscopic examination. Nasal secretions alternating in excess, or deficient. Mucous lining of mouth, throat, tongue, gums, etc., congested, and irregularly covered with various-sized patches of superficial ulceration. Painful deglutition, increased salivary secretions. Fetor of breath. Skin of the arms, neck, chest, and, to a greater or less extent, the rest of the body, covered with an eruption in various stages of progress, attended with a sense of heat, dryness, and itching. Pains in the bones, which are worse at night. Loss of appetite. Irregular menstruation.

As she was not wearing artificial teeth at the time of my visit (on account of the soreness of the gums), I did not have my attention drawn to them. Improvement under treatment was slow, with frequent relapses. After three months had elapsed I discovered that, whenever the state of the mouth would allow of it, she wore the articles mentioned above. I examined them, and discovered that the polish was gone, and under a small lens the surface appeared studded with minute excavations, like needle-pricks. She had worn them sixteen years, and was incredulous when I asserted that I held in my hands the whole cause of her sickness. Why had they never troubled her before? She consented, however, to wear them only when needed to masticate food, and I directed her husband to apply to them, frequently, a shellac varnish. From that time the case was, in every way, steadily improved.

Case 2.—Mrs. C., aged fifty-nine; has been in good and improving health. Recently had a change made in artificial teeth worn; now has a set as above. Requested me to examine her mouth. Discovered the mucous lining of lower gums and cheeks congested, tender, and showing several small, superficial, white, eroded, painful spots. Stated it as my opinion that the mercury used in the manufacture of the plate was being slowly decomposed, from its union to other substances, and was acting both locally and, probably, constitutionally. Moreover, on examining the set, I noticed a plug of amalgam in the concave side of the plate, which, the dentist had said, was inserted to fill a cavity caused by an air-bubble during its manufacture. Mrs. C. then told me that her old family physician had given her a similar opinion, of the correctness of which she is now convinced. I would like to ask, are such cases of frequent occurrence? May not such causes be overlooked, if the local effects are not marked, but the general or constitutional ones are?—*Dr. J. C. C. Downing, in Medical and Surgical Reporter.*

CHLOROFORM AND ETHER.—In view of the mortality in this country from chloroform, we feel called upon constantly to insist upon a fuller attention to the greater relative safety of ether. "The terrible and indisputable fact is that no human care, wisdom, or foresight, can prevent occasional deaths from chloroform. On the other hand, only the grossest mismanagement can render ether-inhalation fatal." This sentence we extract from the last number of the *American Quarterly Journal of Medical Sciences.* As the American experience of ether is very large, and as this journal is the chief medical authority in the United States, we invite particular attention to this clear and pregnant statement. It would only lose by additional comment.—*British Medical Journal.*

Camphor-Water.—The simple camphor-water, *aqua camphora*, of the shops is one of the best and cheapest washes for the teeth and mouth. Its detersive power is great, leaving the mouth and gums very clean and sweet. It is fatal to parasites, and therefore discouraging to tartar and decay. It has also a healing influence upon aphthous sores (canker) of the mouth and throat. It lessens sensibility of the teeth, and tends to resolve the small abscesses known as gum-boils. We recommend it as a standard article of the toilet.

There are some sore throats, and we are not sure but that they include those of a bad type, which appear to be speedily relieved by gargling with camphor-water in the incipient stage. The antiseptic property of camphor, or power to destroy minute organisms, gives it value in many applications to the skin and mucous membrane.

Spirits of camphor is one of the most common domestic remedies. It is singular that camphor-water, one of the most elegant modern preparations of the materia medica, should be still so little popularly known and used.—*C., in Boston Journal of Chemistry.*

Celluloid.—Having heard some little complaint against celluloid on account of the liability to crush the plastic mould in forming the plate, and earnestly desiring to see celluloid supersede the use of rubber by the profession, we take the liberty of suggesting, from our own experience, that perhaps the trouble complained of may be in some degree due to faulty manipulation on the part of the dentist himself.

When we first commenced the use of this material, with the steam apparatus, we met with the same difficulty, and feel satisfied now that it was mainly our own fault, in attempting to close the flask before the plate was sufficiently hot to be plastic. We now have the follower and screw in our apparatus work perfectly free and easy, so that it can be turned down readily with the fingers; placing the case in the chamber, we turn the screw up so as to allow plenty of room for turning down the cap without bringing any pressure upon the flask, the handle being removed from the head of the screw,—with our fingers the screw is turned down till the follower comes in contact with the flask. When steam commences escaping at the safety-valve, the screw is gradually turned down with the fingers until one or two turns with the use of the handle will completely close the the flask. Since adopting this method we have had no trouble from crushing moulds or breaking blocks.—*Missouri Dental Journal.*

HINTS AND QUERIES.

Reply to H. H. B., who asks how to soften the plaster in celluloid work after the case comes out of the press. I use say a pennyweight of salt in the plaster, and have no trouble with it.—T. J. B.

Reply to W. G. B.—Your correspondent, W. G. B., while not very definite in his description, is sufficiently so to indicate the disease as "pyorrhœa alveolaris" of the French writers. The disease attacks the peridonteum, followed by the separation of the gum from the tooth; but it must not be confounded with gingivitis, with which it has nothing to do. Its progress is not marked usually by positive pain, but is attended by an uncomfortable feeling about the tooth. The gum is more or less discolored. The progress of the disease is slow, frequently continuing for years before the tooth is eventually lost. There is, ordinarily, no perceptible discharge of pus, the latter only being observed upon pressing the gum, when a thick drop of purulent fluid will be forced out. The destruction of the periosteum is followed by necrosis of the tooth at the part affected. The disease may be confined to one tooth, but it is not unusual, as in the case cited, to have it extend to others in both jaws.

Microscopical examinations, made by the writer, exhibit unusual numbers of bacteria. Whether these are a primary or secondary result has not been determined; but their presence in such quantities would go far to indicate the former. The peculiar characteristics of these, in certain pathological conditions, have led many observers to ascribe the origin of diseased conditions to their agency. Cohn has divided them into four groups and six genera. In his first group Sphæro-bacteria, genus Micrococcus, he has M. vaccinæ, M. diphthericus, etc.

The cause of this condition is obscure. The writer has not found it peculiarly a disease of unhealthy persons, but those affected are generally of robust constitutions. It may originate in systemic disturbance, but ordinarily has a local origin; and may be ascribed, in a general way, to any irritation superinduced upon the periosteum by mechanical agents. The habit of forcing in toothpicks below the margin of the gum is most dangerous and prolific in arousing inflammation that may, and is likely to, assume a chronic form. Ligatures, wedges, the constant irritation of a thread passed down too low, the too free use of a hard brush at the necks, the accumulation of nodules of tartar, clasps pressing too much at the neck, plates made to fit tightly round the necks of teeth, in fact, anything and everything that tends to produce an abnormal condition at the neck of the tooth, may produce it.

Whether the disease can be propagated from one tooth to the other is a question for further investigation. That it can be, and is, transmitted by the periosteum of the alveoli is certain; and if the agency of bacteria be admitted, it seems not unreasonable to suppose it could be carried to a distant tooth. Previous irritation would seem, however, to be a necessary prerequisite.

It is very evident that we shall hear more of this trouble than formerly, from the unreasonable use of rubber dams and wedges. It is high time an earnest protest went up, from all intelligent observers, against the reckless use of agents which, whilst good in themselves, may be made exceedingly dangerous appliances.

The treatment has not been altogether satisfactory in the hands of the writer. Temporary alleviation of the symptoms has been obtained; but a radical cure has never yet been effected, and from the nature of the disease it is unreasonable to expect it. The rough condition of the necrosed cementum furnishes a base for future deposits and renewed irritation. There are no means yet available for protecting the tooth; careful scraping of the diseased portions may be resorted to in the earlier stages; but it is doubtful whether this will give permanent beneficial results.

Magitot recommends, as a local caustic, "crystallized chromic acid, first in solution, and afterward the dry substance. After having removed the tartar, mucus, etc., and raised the gum slightly, he applies the remedy with a small stick, at the neck of the affected tooth, every six or eight days. The tooth and its surroundings must be covered for some minutes with lint or cotton. The first applications should be very diluted, for it produces, at first, an exaggeration of the symptoms. In a short time the strength of the caustic may be increased." Chlorate of potassa may be administered internally and locally, in combination with borax. If this treatment be adopted, great caution should be observed in the administration of this powerful caustic. It should be very much diluted. Any of the caustic applications are to be used, with the same care, and should not be too often repeated. Chromic acid has not been a success in the writer's hands, and, as before remarked, he has little faith in any topical applications to produce permanent good results.

If your questioner desires further information on this subject, he will find it fully discussed in "Pathology of the Teeth," by Wedl, p. 210; in vol. v., No. 4, *Dental Times;* in a translation from the German of Ad zur Nedden, and also in the "Complete Elements of the Science and Art of the Dentist," by M. Desirabode: Translation: Baltimore, 1847.—J. T.

A PRACTICAL DEVICE FOR AN UNDER-CUT BASE.—I noticed in the DENTAL COSMOS for March Dr. Wildman's practical device for under-cut cases. I have frequently had such cases with very thin edges, and have found, in addition to the mode of setting the cast so as to bring the thin edge perpendicular, that a piece of brass plate, about half an inch wide, punched full of holes, and bent round in the mould before making the plaster cast, so that the plate is imbedded in the cast, to stiffen the thin edge, is a certain mode of preventing the cast from crushing down when the celluloid is screwed home. It is easily removed when taken out of the flask.—H. L. S.

SALIVA PUMP.—An efficient and economical saliva pump may be made, by taking a tube about six inches long, and bending it to form a siphon for mouthpiece. Attach to the lower end a rubber syringe bulb, with valve at each end opening downwards. Extend a rubber tube two feet or more in length into the spittoon. The upper valve should close easily, and fit accurately, to prevent regurgitation. Drill holes near the end of mouth-piece, as the suction will draw the soft tissues across the aperture, and prevent the entrance of fluids. Pressure upon the bulb will force open the lower valve; when removed, it will close; open the upper valve, start the saliva, and the siphon will keep it running until it is all drawn off. When more has accumulated, a slight pressure will start it again.

The rubber dam will protect the tooth, but something is needed to protect the patient. After all our care in placing napkins, etc., under the chin as absorbents, it is very mortifying to find, upon removing them, that the moisture has been quietly oozing from the corner of the mouth, and completely saturated the patient's clothing.—M. LUKENS LONG, *Philadelphia.*

CORRECTION.—In the article entitled "Eclectic Dentistry," by Dr. McDonneld, in the DENTAL COSMOS of February, this sentence occurs. "A little reflection on my past experience in filling teeth on the grinding and proximal surfaces convinces me that I have had a far heavier percentage of failures upon the *former* than upon the *latter* surfaces of the same teeth." A careful reading of the article will show that the author intended that the italicized words should be transposed.

ANOTHER CHLOROFORM DEATH.—On the twentieth day of March, 1875, a young man by the name of Brock, aged sixteen, went to the office of Dr. J. T. Burt, for the purpose of having a tooth extracted. Dr. O. E. Gates administered a half-ounce of chloroform, and in five minutes the patient was dead. So another case is added to the list showing the risk of chloroform inhalation.—L. A. R.

CELLULOID.—As this material is now causing considerable discussion, and there is such a diversity of opinion in regard to its usefulness as a base for artificial denture, I feel constrained to give my experience in working the same.

Three years ago or more I commenced using celluloid. My experience has been somewhat varied, from the fact that I began with the plates first introduced by the company, which were far inferior in shape, coloring, and also in composition, to those recently manufactured.

My mode of working has been entirely original; and I claim, through this mode of working celluloid, the invention of the present steam celluloid apparatus. I discarded the company's directions with their oil tanks, etc., depending entirely upon my old Woodward vulcanizer (which I wished to utilize) to do the packing or closing of flasks,—using, of course, steam instead of oil to soften the material, and finding no difficulty.

I have continued to use my vulcanizer ever since, and think it the best apparatus for the purpose, possessing many advantages over the company's. In the first place you run no risks, as did Dr. Blodgett (see "Hints and Queries," DENTAL COSMOS, vol. xvii., No. 1) in putting up his "Coralline" plate,—who had "set it home sharply when the little cast-iron follower that receives the point of the screw of the press burst," pieces flying in every direction, endangering life. Did Dr. B. know the amount of super-heated steam contained in boiler? I answer no; because he had no thermometer attached.

The boiler of the vulcanizer will stand a pressure of 400°. I never carry the heat higher than, and very seldom to, three hundred degrees. When using the vulcanizer, the movable valve or piston's rising is a *sure* indication that the material is softening, and it is time to tighten the packing-screw, gradually at first, continuing until it will no longer turn under moderate pressure. If desired, after allowing to cool a little, remove cap of vulcanizer (which is independent of flasks, therefore you will not displace them) and ascertain, to a certainty, if the flasks have been "brought home," which you cannot do with any other apparatus.

I use a little alcohol with brush to remove the dark stain of palatine surface, which is always present, unless tin is used, as in "Stuck's method," with rubber, not injuring the plate at all, but cleaning it nicely. By using sheet-block tin on lingual surface and burnishing down, the celluloid will come out with a beautiful polish, more like porcelain than anything I can compare it to.

I use plain teeth when possible,—my patients seem to be better pleased with them. They have not that stiff unnatural look which blocks invariably present; and in cases where the alveoli are at all uneven, they can be used to advantage.

Celluloid, as now manufactured, is equal to the *best* material as a plastic base for artificial teeth. I am quite certain that it has none of the deleterious effects upon the general system that has been charged to the vulcanite.—I. H. ALEXANDER.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

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(Continued from page 229.)

WITHOUT entering into detail as to method of investigation, beyond premising that my first step was the reading of the various European and American authorities upon the subject of medical electricity, I will state that I recommenced my statistics in connection with the employment of induction currents for the alleviation of pain during the extraction of teeth.

Experience soon demonstrated that however excellent those portions of the electro-medical text-books which related to chemical physics and *general* therapeutics might be, all which had reference to applications in the direction of dentistry was characterized by that unreliable and impractical teaching which we, unfortunately, find so usually pertaining to such chapters.

Faradic or secondary induction currents from any of the various helices are universally indicated as the current to employ; whereas, this is the most disagreeable current possible to use in connection with the teeth and jaws. It is sometimes advantageous as an oral therapeutic (muscular), but *never*, so far as I know, as a purely dental remedy.

Forceps are directed to be invested with non-conducting materials; and rubber-tubing, varnish, and silk are given as the means for attaining this desirable end,—all of which is simply entirely unnecessary, and even worse than useless, for it is unclean.

Foot-boards, with spring adjustment for *making* or *breaking* the circuit of the current, are described; than which, probably, no arrangement could be devised which would more unpleasantly, or indeed harshly, place a tooth within a circuit.

Forked cords, for attachment to both handles of the forceps, are suggested, as securing reliable passage of current; a device which is practically nothing but an additional complication.

Directions are given to place electrodes in the hands of the patient, and, with a gradually increasing current, *thus* discern the strength which would be proper to use for anæsthesia in each individual case. For this purpose I have found in practice no method more unreliable, or more surely productive of unsatisfactory results.

It was in consequence of implicitly following such directions as these that impartial investigation decided adversely to the claims of electricity as a local anæsthetic; and yet, notwithstanding the impracticability and error with which the subject was surrounded, a number of favorable cases were found reported by each of the various members of the committee.

As I have stated, it was this circumstance which led me to prosecute that series of experimental investigations which has given me, in Electricity, a local anæsthetic which I regard as worthy of high repute in its adaptation as a dental therapeutic.

It has been demonstrated that such instruments and methods of application as proved most acceptable and efficacious in cases of extraction, have also been productive of like satisfactory results in alleviating pain incident to the various operations of lancing abscesses, drilling into pulp cavities, puncturing pulps, rapid wedging of teeth (by the valuable Jarvis separators), and the removal of sensitive dentine.

Among the various helices which are manufactured for the administration of electricity, I can recommend only three as suitable for dental purposes. These are Hall's, of Boston ("primary current"); Kidder's, of New York (A—B); and Flemming's, of Philadelphia ("Dental Helix"). The first two possess the advantage of being made available for extended application in medical electricity; but I think that for special dental practice the "Dental Helix" is of unequaled excellence.

In order to understand *why* it is that I restrict within such narrow limits advice in relation to choice of instruments, I must state that there are two kinds of "induction current" (pure); the one most generally used is the "fine wire" induction current, known, from its discoverer, Prof. Faraday, as the "Faradic,"—the quality of which is a degree of intensity (harshness) which is generally objectionable, frequently very disagreeable, and sometimes unendurable, when applied to the teeth. The other is the "coarse wire" current, induced by simply elongating and coiling the connecting wire which unites the zinc and platinum, zinc and copper, or zinc and carbon, etc., of the *battery*.

This is known as the "Henry current," having been discovered by

Professor Henry in 1831, and is the form of induced electricity which, in my experience, seems best suited to the therapeutic requirements of our profession.

This current having experimentally proven the most desirable, all helices so arranged as to utilize the "faradic" current only were discarded. It was also found that a *gradual* increase of strength of current was a necessity to success, and therefore instruments which increase the power by "switching" from post to post are regarded as inadmissible.

Strength of current is usually governed by a "strengthening rod," composed of a piece of soft iron, or preferably a bundle of soft iron wires, and placed within the coil of coarse wire, or inner coil of the helix.

If this rod is "movable," the current is strongest when the rod is all within the coil, and it is *weakened* by withdrawal of the rod.

If this rod is permanent, and is separated from the surrounding insulated wire by a metallic cylinder or case, to which is attached a handle, the current is *increased* by withdrawal of the cylinder.

This arrangement is decidedly preferable, as it is by this means much more positively assured that the instrument is, at first, only capable of delivering its mild current.

The advantage which Flemming's "Dental Helix" possesses over all others, is an attached "stand-pipe," by means of which arrangement even the "primary" or "electrolytic" current of all other helices may be so switched off as to be passed through water, thus rendering a form of primary induction current which, for delicacy, is the finest imaginable.

I have referred to the "spring foot-boards" which are made for the purpose of "making" the circuit complete, after the adaptation of the forceps to the tooth, in cases of extraction ; and I wish to repeat that I believe no other one device has contributed so much as this to bring discredit upon the attempts of dental electricians.

To some persons, the sensation evoked by the passage of a current of electricity is pleasant, and even quite strong shocks are not disagreeable; but to most patients this application is agreeable only in proportion to its gentleness and its *gradual* increase *towards* strength.

With some, the mildest *appreciable* current is unpleasant, and even the least increase of this is merely accepted as a *substitute* for the infliction of *greater pain.*

These are the facts, which experience in practice will quickly demonstrate, and it will therefore readily be recognized that a current so gentle as to be, at first, inappreciable, and capable of being gradually and evenly increased, and so manipulated as to demonstrate this capability, would do much toward inclining in its favor even those to whom an ordinary application of electricity is disagreeable.

But more than this, when a current is under the control of an operator, there is, almost always, an indefinable apprehension, a fear of undue increase with inability to resist, and this should be set aside by putting the entire control of increase and rapidity of increase of strength of current in the hands of the patient.

By this means *we do succeed* in graduating every application exactly to the requirements of each individual, and exactly in conformity with the sensibility or want of sensibility of every tissue acted upon.

This is accomplished by directing the patients to withdraw gradually the cylinder from within the coil of the helix, and instructing them how to diminish the strength of current by again pushing the cylinder into the coil.

For extraction of teeth, it is only needed to have a drill-hole pierced through one handle of the forceps near the end ;—into this is passed a copper-wire *hook*, which is attached to a conducting-cord from the *positive* pole of the helix,—an ordinary hand electrode, with cord from *negative* pole, is held in the left hand of the patient; the forceps is placed gently in position upon the tooth or root to be extracted, and the current is then gently increased by the patient with the right hand, until either a slight trembling of the left hand of the patient is observable, or until a preconcerted sound from the patient announces that the peculiar sensation from electric current is markedly and sufficiently felt, when the forceps is steadily pushed to the required depth, and the tooth slowly and carefully taken out.

Immediately upon removal of the tooth, the current passes, for an instant, through the operator, but it ceases the moment contact with the patient is broken.

For the extraction of one tooth, not difficult, I have found it practically better to place the *positive* on the tooth, and the *negative* in the hand of the patient; but for the extraction of many teeth, or of one difficult root, which may necessitate a dozen or more efforts, I reverse the poles and give to the patient an *in-running* current, which evidently supplies that strength which enables the system much better to endure the shock consequent upon such an operation.

Electricity as an agent for obtunding pain during the removal of sensitive dentine.

As I have intimated, the same general principles apply to the use of electricity for this purpose as are recognized in any application of it for the relief of pain ; but, as in almost everything relating to practice, there are details which seem absolutely necessary to that comprehension of the subject which shall insure success.

In this connection, more than in any other, I have seen the advantage of the Dental Helix over other instruments, and shall therefore desire to be understood as referring to that instrument.

I have found an ordinary zinc and carbon battery (one cell), charged with a mixture of equal parts of the solution of bichromate of potassa and water, to be the most reliable and most convenient battery for this helix, as it continues in efficient working order for many months, requiring only an occasional addition of a little water. The zinc and carbon should be taken out of the solution when not in use.

It is also necessary to have a dental electrode with two sponge attachments,—one *small*, for use in the mouth, to apply on the gum, over the root of the tooth containing the cavity to be excavated.

This will generally be found useful for both upper and lower incisors, cuspids, and bicuspids.

The other, *large*, for applying on either side of the face, just in front of and below the meatus auditorius externus, when it is desired to excavate cavities in either upper or lower molars.

The dental electrode is so arranged as to unite the positive and negative electrodes in one, and thus, by completing the circuit with the employment of only one hand (the left), the right hand is free to manipulate the handle of the helix cylinder.

Thus under direction, the patient attends entirely to the administration of the electricity, and leaves the operator free to regard only the management of his bur-engine and the considerations pertaining to the judicious shaping of the cavity.

Until I had the appliances for the successful use of electricity, I would occasionally meet with cases of sensitive dentine over which none of the usual remedies had any control, and to operate with any degree of comfort for such as these, it was found necessary to use general anæsthetics.

For every case of the kind which has occurred in later years, I have found my helix equal to the emergency, and scores of patients can add their testimony to the great relief which has been afforded them through such use of electricity as I have here indicated.

(To be continued.)

DENTAL EDUCATION.

BY ROBERT ARTHUR, M.D., BALTIMORE.

No. 2.

The present system of dental education originated in this country with the founders of the "Baltimore College of Dental Surgery." It has undergone but little change since it was first put into operation, at the time of the establishment of that institution, in 1840.

In this system, besides the practical branches, two kinds of theoretical instruction are provided for, viz., the strictly technical, and that which relates to the general principles of medicine, so far as they are regarded as having a bearing upon dentistry.

What may be regarded as the technical portion of the curriculum, so far as theoretical instruction is concerned, embraces dental anatomy, physiology and histology, dental pathology and therapeutics, and such general principles as underlie operative and mechanical dentistry.

To whatever extent, either limited or expanded, the study of general medicine may be considered important, it will not be denied that everything relating to dentistry strictly, both theoretical and practical, should be taught in a dental college in the most careful and thorough manner. I propose in examining the whole subject broadly, as it is my intention to do, first to consider, in some detail, the technical features of such a course of instruction as would be considered by the more intelligent members of the dental profession necessary to anything deserving the name of a thorough dental education.

I may premise, with regard to all teaching, that pupils must be regarded as ignorant of the subjects brought to their attention. The best teacher is the one who simplifies his subject so as to make it clear to the apprehension of the most inferior minds of his class. It must be, in this connection, remembered that in both medical and dental colleges students are admitted without previous examination. In no one of our dental colleges is any question made as to the previous education of the applicant for matriculation. There is no restriction in this respect, and I am sure that it has been the experience of many of my readers to encounter graduates of dental colleges who were unable correctly to write or speak the English language. That many such men, devoid even of a common school education, with no habits of study, and without the slightest knowledge of medicine, enter dental classes, will not be denied. If such individuals are admitted, the instruction given must be brought down to their capacity to receive it; and this cannot be accomplished, as I have already intimated, unless every subject taken up is most carefully and minutely explained. Even the average student cannot be referred to the comparatively compact presentation in text-books of the subjects of study. If these were sufficient for purposes of instruction, the lecturer would be superfluous. The teacher's knowledge of a particular subject should be so extensive as to enable him to present the views of all authorities bearing upon it. Such an investigation as this implies the student cannot make for himself, even if the information is within his reach, both from lack of time and from his inability to distinguish between truth and error, which the light furnished by the application of theories in actual practice gives to the experienced practitioner and teacher.

I propose in this paper to consider briefly, although in some detail, what is embraced in the subject of dental pathology.

In nearly every one of our dental colleges,—not in all, strange to say,—this subject is given a prominent place in the curriculum. In a strict sense this term would be limited in its application to diseases of the teeth. But this limit cannot be maintained, as abnormal conditions of the teeth themselves cannot be comprehended, unless they are studied by light derived from general pathology. It would be idle to attempt to explain disorders of the teeth, and those to which they immediately give rise, without some knowledge on the part of the student of the general principles of medicine. I propose now, however, to consider what duties must devolve upon a teacher of dental pathology, even when restricted to those affections with which a competent dentist must be acquainted.

If all abnormal conditions dependent upon the teeth come within the limits of this department, the subject of disorders of first dentition is one that should be brought very carefully to the attention of a class of dental students. There are many important reasons for this, which I cannot now take time to state.

The deciduous teeth claim a large share of attention. The treatment of these teeth is a subject which has been, and unfortunately is still, neglected, to the great injury of children. The influence of disordered conditions and the premature loss of these teeth (so commonly destroyed, as they are permitted to be), upon the health of children and upon the regular development of the permanent teeth, are questions of importance in the practice of dentistry which cannot be overestimated. That this subject should be thoroughly discussed by the teacher of the branch under consideration, no one who has given any careful attention to it will deny. The neglect of these teeth, and the consequent suffering and injury to little children, is a reproach to the dental profession, or at least to those who fail to see or who disregard their obligations in this particular. It is the duty of every humane man to do all in his power to induce parents to understand the importance of giving such attention to the deciduous teeth as will prevent the occurrence of the evils to which I refer, the extent and serious character of which should be fully explained to a dental class.

The subject of dental caries claims, in a course of lectures upon dental pathology, elaborate attention. Whatever differences of opinion may exist as to the extent to which the collateral branches, so called, are essential to a dental education, it will be at once admitted that this is a subject about which a competent dentist must have the fullest and most exact information.

As an incalculable amount of human suffering has resulted from dental caries, it has naturally attracted a great deal of attention. The phenomena it presents have been carefully observed, and all causes appearing to have even the slightest bearing upon it have been thoroughly studied. In the lapse of years, since dentistry has begun to develop into a pursuit having any claims to a scientific basis, this subject has necessarily been one to which the most earnest attention has been directed. It is not only desirable as a matter of historical interest, but it is important, that a student should be clearly informed of many of the phases of opinion which have been held upon the subject. We reach or approach truth by very slow gradations; every earnest effort made in the investigation of any subject, even if it should fail to discover the truth sought after, never fails to shed more or less light upon it. It is of great use, in some cases, to look back upon the steps which have been taken to arrive at certain conclusions, and this examination rarely fails to render these conclusions clearer and more satisfactory. The subject of dental caries is no exception to this rule. Although the views which are generally received at the present time are more satisfactory than any formerly entertained, yet it must be admitted, as asserted by one of the most able investigators of "Dental Pathology" (Wedl), "that a theory with regard to caries, with a thoroughly scientific basis in all its details, is still wanting."

While, therefore, we are still endeavoring to fully solve this problem, trusting that, the nearer we approach to its solution, the greater will be our ability to combat this destructive disorder, it becomes important that those who are about to take their places in the dental profession should be fully informed of the stage we have reached in our progress towards the truth upon this subject. In order that he may be prepared to make further advances, he should be well informed about the field already traversed, and should know exactly the value of the position we now occupy. He should, therefore, be made acquainted with all the theories important enough to have attracted general attention advanced by men of acknowledged ability. As the question is not yet settled, it is not wise to declare that all views heretofore held, although for the present laid aside, are absolutely erroneous. Some reserve of decided opinion will be maintained by intelligent men. But however decided the opinions of a teacher of this subject may be, he cannot justly withhold from his students the right of comparing them with those of others, and of judging for themselves. In referring to theories heretofore advanced, it is necessary to do something more than merely to mention them; they must be presented in such detail as their importance demands, and the grounds of their real or supposed fallacy shown by the light of present views.

In considering the subject of dental caries from our present stand-point, it will be found to have a wide range. In the first place, it becomes necessary to direct attention to deviations from what may be considered the normal condition of the dental tissues—a subject of the first importance, as bearing upon predisposition to caries, and such prophylactic measures as may be employed. In this examination there must be carefully taken into account hereditary influences; disordered conditions of the system of the mother during gestation; the effect of constitutional disorder at any time during the formation of the teeth, or subsequently. This is a feature of the subject to which I can merely direct attention, but the importance and great extent of which no one will venture to deny.

Then must come a careful consideration of agents capable of causing this affection by direct local action,—the fluids of the mouth, their normal condition, the chemistry of the saliva and the mucous secretions, the causes which lead to changes from their normal condition; what may be termed the normal characteristics of the buccal secretions, and the nature of abnormal changes to which they are subject; a comparison of that condition in which these secretions do not appear to exert any deleterious influence upon the teeth, with that in which they appear to be capable of quickly producing a destructive form of caries; the differences, in this respect, of different individuals apparently in equally good health; the influences of constitutional disturbances upon the character of the buccal secretions. It will be a very superficial view of dental caries which does not take into account the abnormal conditions of the general system, as bearing upon this affection—a broad subject for the instructor of dental pathology.

A full examination of the relative power of the buccal secretions, and agents introduced into the mouth, of producing caries; a full presentation of the discussion of the question of the agency of bacteria, vibriones, and leptothrix as factors of dental caries, besides many other considerations to which I have not space to call attention, bearing strongly upon the subject.

There is not a single point to which I have thus briefly made reference that will not require considerable time to make clear to any dental class, and there is not one which does not demand the fullest exposition. If justice is done to this important subject, a large part of the course will be occupied with it alone. I will not pretend to say how many lectures should be devoted to it, but any one who will reflect upon its extent must admit that a considerable number will be required.

After having gone carefully into the general consideration of the subject of dental caries, we come to its manifestations, with special reference to the treatment required. This is a branch of the subject demanding most careful attention. While it becomes the duty of the professor of operative dentistry to explain the manual and mechanical processes involved in practice, it is a part of the duty of the teacher of dental pathology and therapeutics to treat the subject on a broader basis. While the former is most concerned with the remedial measures relied upon, it becomes the duty of the latter to present the subject in such a light as will enable a dentist to do all that is possible to avoid the necessity for many of the elaborate and difficult operations now generally required. This is the greatest possible service he can render the coming members of the dental profession, and the community, in this particular. Whatever his own private views may be, and however to the injury of his patients in his own practice he may disregard suggestions looking in this direction, he is in an entirely different position as a teacher. He is bound, by the responsibilities he has assumed, to examine the merits of such suggestions, if they possess any apparent value, and, if fallacious in his opinion, must show them to be so.

In studying the symptoms of decay, it becomes necessary to ascertain the points first attacked, and the circumstances which lead to the location of this attack. In this inquiry the external forms of the teeth and their relations to each other, in their natural positions, are to be carefully considered. Whatever theory of caries may come finally to be adopted, observation shows that any condition which will enable a lodgment and retention of particles of aliments, or the fluids of the mouth to take place, upon any part of the surfaces of the teeth, will favor an attack of caries. The proximate surfaces of the teeth are for this reason very subject to caries, and this fact at once opens up a subject of paramount importance.

As to the best method of meeting the condition of things here referred to, there are wide differences of opinion. It is of great importance that the question should be fully examined, and the student led to consider all suggestions bearing upon it. In this respect great changes are taking place in practice, and a teacher will fall far short of his duty if he should close his eyes to this fact. But I find I am going further into particulars than I intended, and must rapidly pass on to the close of this paper.

The whole subject of dental caries, in its simplest aspects, is fraught with interest. The principle of treatment is simple and easily understood, but when it becomes complicated with affections of the dental pulp, the field widens. There are to be considered the abnormal conditions of this body which may occur before exposure. After it is deprived of its natural covering of dentine, what is the best treatment? This is a question now demanding full discussion; and upon whom can the necessity of fully investigating it devolve more rigorously than upon one who attempts to teach? This is a question about which a broad difference of opinion exists at the present day. The common practice among the better class of dental practitioners has heretofore been to extirpate the pulp entirely when it became exposed, and the more thoroughly this was done, the better were the results.

It has always been claimed that the removal of the pulp after exposure was not only unnecessary, but even injurious. Experience in past years did not, so far as careful observation went, bear out these claims, and in many cases it was found that success was only apparent. Of late, however, it is claimed that success is nearly uniform in the preservation of the pulp after exposure. This is a subject demanding, from its importance, a due share of time and attention.

The consequences of inflammation of the pulp and alveolar membranes is an extensive subject. It involves that of inflammation, and from an examination of the announcements of the Dental Colleges in my possession, I see no provision made for instruction upon this subject except by the Professor of Dental Pathology. The subject of inflammation is one of great importance, forming, as it does, so constant an element of abnormal conditions. The treatment of the pulp and alveolar abscess cannot, in many cases, be successfully conducted without a knowledge of this subject. It is, as we all know, a disordered condition of intricate and complicated character. "The *nature* and *course* of the phenomena of inflammation," says a recent writer, "require for their comprehension a clear consideration of the laws which govern nutrition, the capillary and arterial circulation, and innervation, in their mutual relations, under the influence of normal stimuli and morbid irritants." It is apparent that it will be no easy task to make clear to a man of limited education, and with no knowledge of the general principles of medicine, such a subject as inflammation; and yet, if he is to be given an education adequate to fit him for the fullest requirements of the practice of dentistry, he must be made to comprehend it.

Other affections more or less serious, resulting from disorders of the pulp or from its obliteration, require careful consideration. Exostosis, affections of the antrum, necrosis of the alveoli and maxillæ, salivary fistulæ, tumors, etc., all these are subjects requiring careful attention.

Disorders of the nervous system, and especially those associated with the trigeminus, are of the deepest interest to the dental student. This is the case, because the teeth are so frequently implicated with these affections, and because, in the general practice of medicine, their agency as exciting-causes of some of these disorders is either overlooked or disregarded. This is no new charge; it has been frequently made, not only by dentists but by intelligent medical men.

Neuralgia, as every dentist of experience is aware, is frequently caused by the teeth when in a disordered condition. Wedl, in his able treatise on dental pathology, recently translated and published in this country, enumerates as "*exciting-causes* of neuralgia," within the precincts of the distribution of the second and third divisions of the trifacial nerve, the following: "*a*, chronic inflammation of the pulp, since this and its products maintain a constant irritation of the pulp-nerves." [This inflammation may be caused by a filling.] "*b*, new formations of hard dental tissues within the pulp under certain circumstances; *c*, proliferations of cement at the extremities of the roots, whereby the nerves which enter the teeth are bent more or less from their proper course, or the same nerves at a distance from the apices of the roots, together with the nerves of periosteum of the root, are irritated; *d*, chronic inflammation of the root-membrane, with sequelæ, particularly in the vicinity of the apex of the root; *e*, new formations of the root-membrane, when they encroach upon the precincts of the nerve-branches; *f*, periostitis, especially in the grooves, or the foramina, which serve for the transit of the dental nerves; *g*, osteophytes, which occasion an irritation of the periosteal nerves; *h*, tumefaction of the mucous membrane and periosteum of the antrum of Highmore give rise to pain and even a neuralgia of the posterior superior dental nerves (Schuh) in otherwise sound teeth, which circumstance Luschka explains by the fact that the dental nerves pass through complete bony canals in some places, but in others lie in very shallow grooves in the bone, so that they are in immediate contact with the tissues of the periosteum, and, if the latter be removed, they become exposed; *i*, anomalies of position, whereby resorption of one or another root, or of the crown of the adjacent tooth, is occasioned by the growth of the roots of the displaced tooth, and the contiguous portion of the root of the former is subjected to a continual irritation; *k*, teeth which remain imbedded within the jaw sometimes irritate the dental nerves of other teeth by the growth of their roots; *l*, inflammatory irritation of the gingival nerves, which cover the coronal portions of the teeth during the first dentition; *m*, inflammatory irritation of the gingival nerves, in connection with the difficult eruption of teeth during the second dentition, especially of the wisdom-teeth; *n*, tumors of the jaws, inasmuch as they sometimes occasion an irritation of the dental nerves; *o*, foreign bodies which have penetrated into the pulp; *p*, lesions produced by unsuccessful extraction of teeth."

I have made the above extract to show the extent to which the subject becomes a necessary part of the instruction of a dental student. In looking over this list of exciting-causes of neuralgia, it is apparent that their mere enumeration is not sufficient for the purpose of instruction; they all require careful elaboration. I can, of course, do no more than glance at this subject, but this glance shows its extent and importance.

It is not neuralgia alone which is a subject of interest in this connection. Peripheral irritation of the trifacial nerve manifests itself in other affections, in regard to which a dentist should be well informed.

In this connection the subject of constitutional disorder, and its predisposing influence upon neuralgia and other nervous affections, and, on the other hand, the subject of constitutional irritation, as the result of neuralgic affections and other painful disorders occasioned by the teeth, must be fully considered.

I have thus prescribed a brief and very imperfect synopsis of a course of instruction in dental pathology. No intelligent man in the dental profession will accuse me of having drawn too broad an outline. It will, on the contrary, be obvious that I have failed to refer to many subjects which require attention in such a course. I regret that other demands upon my time prevent my giving this subject more careful treatment. But I have said enough, I trust, to make it very plain that the requisite attention to all the subjects which must come up for careful consideration in this department of the curriculum of a dental college will fully occupy the time which any individual can give to it during the brief limits of a winter term of a dental college.

I will refer in a future paper to dental therapeutics and oral surgery. My purpose in treating this subject in detail will appear in the sequel.

A NEW DESCRIPTION OF THE INFERIOR DENTAL NERVE.

BY PROFESSOR SAPOLINI, OF MILAN.

(Translated from the Italian for the DENTAL COSMOS by John Guitéras, M.D.)

WHILE studying the mode of union of the chorda tympani and the lingual nerves, the author noticed a nerve which came from the superior dental foramen, became isolated, and disappeared between the fibers of the external pterygoid. This nerve he has called the *small dental*, to distinguish it from the large, or *inferior dental.* Sixty-six dissections were made for its study, all the preparations having been preserved. In twenty-one of them the nerve runs a separate course.

To find the inferior dental nerve, says he, remove first the soft parts, including the masseter muscle, then the zygomatic arch and the temporal muscle, and saw transversely through the upper jaw above the foramen, taking care not to injure the nerves beneath. This exposes above the external pterygoid muscle, and below the nervo-vascular trunk of the inferior maxillary. It is best now to commence the dissection from the superior mental foramen by removing with the forceps the cellular and adipose tissue, but not the aponeurotic lamina, which extends from the spheno-maxillary and stylo-maxillary ligaments. The trunk of the nerve is usually soon exposed, but often a filament is first seen and should be followed upwards by dissection of the overlying tissues. It describes a curve to which the inferior dental is a chord, and generally reaches the oval foramen posterior to that nerve. They enter the superior dental foramen together. This filament does not always take this course, but varies as follows:

1. It runs near the large dental, and in its external surface included in the same sheath. Removing this, we see the smaller nerve wrapped in a thin sheath of its own, which appears more manifest if the preparation is left for two or three days in a solution of carbolic acid. Below, the small dental runs toward the anterior edge of the larger; above, it disappears, dividing into two branches in the connective tissue,

which forms the matrix of the point of union of the different branches of the inferior maxillary nerve. This variety may be called typical.

2. The same as the first, below; but as the two nerves approach the base of the skull, they are separated from each other by cellular and adipose tissue.

3. The small dental, always in its own sheath, is separated from the large in some part of its course by one or two branches of the internal maxillary artery, very rarely by this artery itself. Rarely also, instead of the small nerve being behind these vessels, it is anterior, and the other is posterior.

4. The lesser nerve is entirely independent, being separated through its whole length by cellular tissue and by the vessels.

5. Adherent to the large nerve at the superior dental foramen, but always in a separate sheath, it soon divides into two branches, one running along the greater nerve, the other going backward to the external portion of the superficial auricular, and through this to the oval foramen.

6. The two nerves, being separated already in the canal by vessels and cellulo-adipose tissue, are further separated by the external pterygoid. The small dental may go outside or inside of this muscle or through its fibers.

7. The small dental, lying close to the large, soon after it leaves the superior dental foramen, divides into three branches. The first, a short one, unites with the large dental; the second is directed backwards and upwards, and unites with the superficial auricular; the third, and longest, ascends, separated by different elements from the large dental to lose itself in the trunk of the inferior maxillary nerve.

These seven varieties may be reduced to three.

1. It runs along the greater nerve, in its own sheath, only separated by some cellular tissue.

2. It is separated by vein, artery, or muscle.

3. Separated from the greater at the superior dental foramen, it divides into two or, at times, into three branches.

Hence it follows that, from the base of the skull to the superior dental foramen, this must be considered as an independent nerve.

After immersing the specimens in carbolic acid and dilute alcohol, we are enabled to discover a perineurium on each of the two prolongations of the small dental. These prolongations enter the Casserian ganglion, having a large portion of the ganglion-pulp resting on them. They enlarge a little and become of a darker color, but in the preparations the author was able to follow them through the ganglion and assure himself of their continuity. Every branch becomes ganglionated, and then is continuous with the two or three white rounded fasciculi in the great trunk of the fifth nerve. These filaments of the small dental form the anterior margin of the inferior maxillary, separating it from the superior. No filament of the motor roots of the fifth pair enters into the composition of these two branches of the small dental.

In the dental canal the inferior dental nerve is found to be composed of five fasciculi, each having its own perineurium. Before entering the canal they present themselves from the outside inwards and from before backwards, thus: the *small dental*, which usually turns forwards, and is separated from the rest by the dental artery; the *posterior marginal*, which becomes posterior to the artery on entering the canal; the *median*, which is applied to the preceding one, hardly showing itself on the antero-external surface; the *anterior marginal*, which lies in front of the preceding and forms the anterior margin of the nerve; the *internal*, lying in contact with the internal pterygoid muscle, and forming a curve from before backwards, opposite the small dental. On entering the canal, the third and fifth unite, and the second subsequently becomes connected with them. Other unimportant communications also take place.

Laying open the dental canal, three nervous fasciculi are easily detectable. The first is the small dental, which is superficial to the greater dental, and winds around it from behind forwards. It occupies the higher part of the canal, masking the principal portion of the great dental until opposite the fourth molar, when it becomes thinner and disappears. A second division appears under the small dental a half-centimeter below the foramen, grows larger, gets above the small dental, and dwindles down near the second molar. The third division is first seen between the fourth and fifth molars, rounded and large, covering the second fasciculus. It follows the canal and comes out through the dental foramen.

The small dental is then altogether independent; and, as it is the nerve of sensibility of the teeth, its being separated from the rest would perhaps make it easy and advantageous to resect it in inveterate neuralgia. Continuing the investigation, the author found the small dental to supply the dental branches, simulating a comb with the teeth directed obliquely upwards.

It is thin at the incisors, and grows larger up to the last molar. Opposite the mental foramen it is deeply situated, passing under the bony circle of that foramen, and receiving anastomosing branches from the other two fasciculi, forming a sort of plexus.

The second fasciculus, the intermediate or superior portion of the great dental, after anastomosing with the small about the first and second molars, envelops itself in connective tissue and terminates in large branches to the incisors, the canines, and the opposite side of the jaw.

The third fasciculus receives a large branch from the second near the superior dental foramen; but it only communicates with the former through the branch mentioned near the external foramen.

These variations were derived from twenty-nine specimens; but the whole sixty-six show the small dental to be entirely independent.

We have seen then: 1st. That the *small dental* is a nerve running along the roof of the dental canal. 2d. That it is formed by nerves from all the teeth. 3d. That it thickens as we approach the molars, and that the branches do not anastomose, but go side by side to make up the fasciculus. 4th. That, formed by these nervous affluents, it emerges from the superior dental foramen. 5th. That before emerging it changes its directions, running obliquely, so that from being superior-anterior it becomes posterior-exterior. 6th. In the ascending portion the small is generally separated from the large nerve by a branch of the inferior dental artery or by the artery itself. 7th. That after emerging it is situated between the ramus of the bone and the internal pterygoid muscle, or rather between the fibro-cellular and adipose layers in the greater. 8th. The *small dental* in its course to the foramen ovale presents the following variations:—*a.* It is separated from the greater by adipose tissue:—*b.* One or more vessels may separate themselves:—*c.* A portion or the whole of the external pterygoid:—*d.* The small dental is formed of two filaments which unite in the inferior maxillary nerve either at the foramen ovale or before reaching it:—*e.* The *small dental*, after joining the inferior maxillary, penetrates under the rete of the temporal, buccinator, and pterygoid nerves, which protect it, besides the granular sheath common to large trunks. They traverse the Casserian ganglion, uniting with two or three undulating terete filaments:—*f.* The filaments of the small dental form the anterior limit of the inferior maxillary nerve, separating it from the superior maxillary.

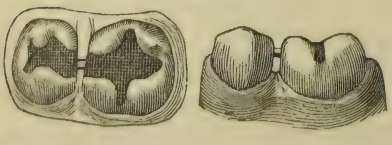
PERMANENT SEPARATION OF PROXIMATE FILLINGS.

BY J. A. WOODWARD, D.D.S., PHILADELPHIA.

The following is offered by way of suggestion, it having proved effective in securing permanent space between large proximate fillings, or fillings and sound teeth, in the molars and bicuspids.

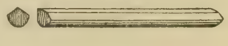
Cut the proximate surfaces of the teeth free of each other, securing firm cervical margins. Fill, and finish even with borders of cavities. (Fig. 1.) Should additional space now be desired, separate the teeth by the means best adapted to the conditions present. This done, hold them apart by a piece of gold wire anchored into one filling and resting against the other, or against the sound tooth.

Fig. 1.



To anchor this wire in such a case as illustrated, cut a deep groove with a sharp round bur—generally a little more than half a line in diameter—in the grinding surface of the filling in the molar, extending to the mesial surface, being careful not to expose the walls of the cavity at any point. Slightly undercut the distal end of the groove; select round gold wire the same size as the bur used. File half the circumference into two flat surfaces. (Fig. 2.) These flat surfaces facilitate packing around it, and the wire being the same size as the groove, all lateral movement is avoided while securing it. File the ends off until it can be driven sufficiently tight to be retained between the distal undercut end of groove and proximate surface of the filling in the bicuspid tooth. Lay a mat of soft foil in the bottom of the groove; place the wire in position, with apex of flat surfaces towards the mesial grinding edge of the molar. Weld around and over it with rolled foil—No. 30—preferred for this purpose. Finish. Ordinary use of tooth-brush and quill-pick will insure complete cleanliness.

FIG. 2.



This secures permanent space at the cervical margins of the fillings, with very nearly self-cleansing proximate surfaces, and gives perfect freedom from pressure of food on the gum in mastication.

THE PREPARATION OF THE TEETH FOR FILLING.

BY CORYDON PALMER, D.D.S., NEW YORK.

(Read before the First District Dental Society of New York, April 5th, 1875.)

In the preparation of the teeth for permanent filling, their susceptibility to the influence of heat and cold, and liability to inflammatory action, must be considered.

Preparation for permanent filling embraces the treatment of sensitive dentine, the cutting away of the teeth, and temporary filling.

The management of the infant or deciduous teeth deserves especial care. The practice of extracting the deciduous teeth for toothache and for the cure of abscesses should be avoided. For the most part, kindness and gentle manipulations, with suitable dressings, and such temporary fillings as may preserve them for usefulness during their natural period, are all that will be required.

The deciduous teeth yield more readily to treatment than the permanent teeth, and consequently require less active remedies. Spirits of camphor, applied as a dressing, will be found soothing and useful, whilst one or two careful applications of carbolic acid will be sufficient to complete the devitalization of any of their exposed pulps, and leave the teeth in a condition to be prepared and filled temporarily. Pure genuine Hill's stopping is one of the best materials for the filling of such teeth.

The permanent teeth of the young present greater difficulties, having a large amount of vitality without much solidity, rendering them liable to decay, and withal extremely sensitive. At the same time there is, upon the part of young patients, a lack of mature or reasonable judgment to enable them to submit to treatment, rendering such cases the more difficult to manage. In preparing this class of teeth, it is a good rule in all living or sensitive teeth to be careful not to remove too much of the softened dentine in the direction of the pulp. It is better to leave a portion, in order that, after it has been saturated with carbolic acid, it may be dried off with warm air and covered, to exclude air and moisture, when, particularly in the teeth of the young, the portion thus treated will recover and harden surprisingly, forming a more natural protection than would any artificial substance interposed. In addition to this, in many cases, it may be better to fill a portion of a *large sensitive cavity* one-eighth, one-quarter, or even one-half full of some non-conducting substance to prepare it for gold filling. Hill's stopping and Guillois's cement are among the best materials for such preparation.

The permanent teeth of the young should have such preparation and temporary filling as will preserve them for a time until consolidation takes place and renders the teeth less sensitive, when permanent gold filling may with more propriety be resorted to. A little time, a few weeks or months, with a child, is of great importance in the management of the teeth. Stop them temporarily. Tin filling will preserve the young teeth best, and give time for consolidation.

Such cases admit of a greater range of filling material than the ones first mentioned. Hill's stopping, the different preparations of oxychloride of zinc, tin foil, and gold are the ones to be relied upon. It may be safe to give tin the preference. When tin is employed as a temporary filling in this class of teeth they seem to recover, and consolidation goes on better than when other kinds of filling are employed.

In the preparation for the permanent filling of the adult teeth, the dam serves a most useful purpose to secure dryness and better bring to view the imperfections of the parts. Embracing as it does the necks of the teeth firmly, it has a tendency to obtund sensibility, also affording protection to the mouth and lips against friction and the irritation of dressings.

Of the various agents proposed for obtunding sensitiveness in dentine, none seem to be wholly efficacious, and some are clearly objectionable. The two most to be avoided are chloride of zinc and arsenic. The first seems to serve no purpose but to inflict pain, and the latter is dangerous in all its forms. The best pure concentrated carbolic acid may be said to be the most reliable agent for the purpose of any thus far made known.

The manner of applying it may be varied. Ordinarily, good effects may be had by keeping the point of the instrument used in cutting charged with carbolic acid. Another mode is to pass over the sensitive surface with a keen, delicate knife-point charged with the acid, making neat transverse cuts all over the surface, so that the portion thus treated may be removed with less pain.

Another plan is to apply the acid upon a suitably-formed burnishing instrument so rounded that it can do no injury, and yet will effectually reach all parts of the sensitive surface. Exerting tolerant pressure, continue rubbing until dryness is obtained, when a portion may be removed with less pain. Still another plan (last but not least) is not without its advantages, and that is, to apply the acid, and then dry off with the hot air blower.

In the preparation of the teeth for permanent filling, the different kinds and qualities of the material to be employed must be considered. Of these, soft gold and tin foil are the most important. The retention of such fillings must depend upon the opposing or surrounding walls, whilst hand-force must be more or less employed. The gold and tin foil must be so formed that they will admit of being introduced with lateral as well as direct force, and in that case the cylinder is the best of the forms employed.

In the preparation for filling and restoration to be made with cohesive gold, different forms and force will be required,—mallet-force being considered best,—the gold depending less upon opposing or surrounding walls, and more upon a firm retention at the base. The preparation should be made with a view to sufficient retention of the gold to admit of the restoration of the original size and form of the teeth.

The forms and means used to secure the gold firmly at the base are opposing angles, grooves, and gold screws; the latter being highly useful, but perhaps more frequently resorted to than is really necessary, if the most cohesive gold were used from the starting points; that is, when dependence is had wholly upon the gold without screws. If there is any part of the filling that requires the properties of the most cohesive gold, it is that part which is designed to form its *retention* at the *base.*

The gold for such starting points should be the most cohesive, and prepared without handling with the fingers, so that when introduced its attachment may be perfect, and the gold become strong and hard, making it equivalent to the gold screws.

The cutting away and forming the surface to be built upon must vary according to the amount of restoration to be made.

It is, for instance, a superior central or lateral, with an eighth or a quarter of the crown to be restored. The edges of the labial and lingual walls must be filed or cut away until sufficient strength is obtained. In most instances, it is best, after forming the main body of the cavity, to extend it, forming a neat and suitable groove along the cutting edge, so that the form produced by the gold shall be continued along the cutting edge to give strength, with less liability to be forced off at the termination of the filling at the edge of the tooth. (See Fig. 1.)

FIG. 1.

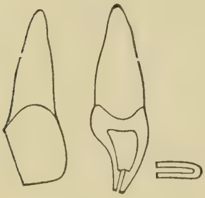


FIG. 2.

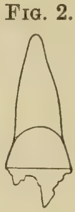
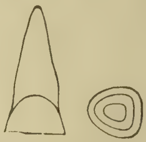


FIG. 3.



If it is a half crown to be restored, the irregular portions must be cut away so as to form a clean, square, firm base. (See Fig. 2.)

If it is a whole crown to be restored, and the pulp is unimpaired, after cutting away to good, square, firm base walls, a retaining groove should be formed without encroaching upon the pulp, and leaving a portion of dentine next the enamel for strength, so that when the most cohesive gold is driven into the groove for retention, it may be attached to and built upon until the whole crown is complete. (See Fig. 3.)

Should the pulp have disappeared, then still greater facilities are afforded for attachment and strength.

The preparation of the teeth in certain cases of capping, and where elongation is required to arrest the wearing away, must be described separately.

For instance, that condition in which the posterior teeth have been lost, throwing the force of mastication upon the anterior teeth, causing the inferior incisors to wear upon the lingual surfaces of the superior incisors until a shoulder has been formed upon the lingual and base part of the crown, leaving a thin, sharp-edged labial wall, presenting the appearance of the original form, but lacking strength, and liable to be broken away. In such cases, although for appearance it might be desirable to retain the enamel, it is more safe to shorten the front until square firm edges are obtained. If this precaution should be omitted, and the front wall be left standing and built against, it will be liable to be carried away by the force of mastication or sudden concussion. (See Fig. 4.)

One instance further. In the restoration of the molars and the bicuspids,—particularly the latter, where separate, disconnected cusps are left standing,—it is advisable and more safe for the permanence of the operation and the durability of the teeth to shorten and square off such cusps, until good firm bases are obtained. (See Fig. 5.)

Still another. When a nerve canal is to be prepared for filling, the usual practice is to open the lingual surface in order to go straight into the nerve canal. This is not always best. If there are cavities of decay on the lateral surfaces of the teeth, it is better to approach the canal from one of the two sides. When the canal is opened into from the lingual surface, it will be found difficult to reach, through such opening, that part of the pulp chamber which widens and terminates in horns near each corner of the cutting edge of the tooth. When the pulp chamber is approached from the side, these points can be reached more readily. Another reason why it is better to pursue this course, is that the teeth opened and treated from lateral cavities will have more remaining strength than when both sides and the center are cut away in the preparation. (See Fig. 6.)

Fig. 4.

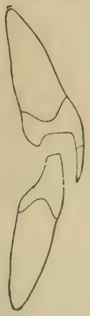


Fig. 5.

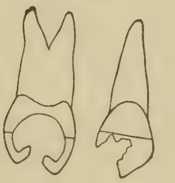
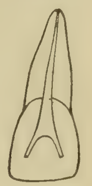


Fig. 6.



PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 257.)

The secretary than read a paper upon "Gold," by Dr. G. V. Black, Jacksonville, Illinois.*

The following discussion was elicited by the reading of Dr. Black's paper:

Dr. W. H. Atkinson. There are points of instruction in the paper we have just listened to that I think are worthy of special commendation. In the opening of the paper there is an expression of a sense of a lack of ability on the part of the writer to prepare such a paper as this body demands and this body is worthy of. I felt just then like saying, "That is all put on. You are saying what you don't mean." After hearing the paper I must indorse it as the very best,—the *ne plus ultra*—on that subject that I ever heard. I never have been so pleased with a production on metallurgy in the whole range of my reading.

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* This paper was published in the Dental Cosmos, March, 1875.

It has encouraged me to think that we are coming at length to a professional status; that we are coming to the position in which we shall scientifically understand the principles that underlie the processes that make our success or our failure in our efforts at arresting diseased action. There is a close connection between many of his remarks and the subtle principles of organization. I am pleased to see that the gentleman confines himself to his own observations and the deductions from his observations, and the confirmations of those in practice. I simply desire to make these remarks as indicative of the manner in which his paper impressed me, and to congratulate this body on the progress it is evidently making.

Dr. James Truman. In 1869, when Dr. Black gave us his first paper, it impressed me as being the most valuable article on that subject that had appeared up to that time. In order to be personally satisfied, I followed him in a number of experiments and obtained similar results. He settled the question in my own mind, and doubtless many others, in regard to the character of the deposit on gold foil when exposed to the atmosphere. The manufacturers of gold foil seem to have been deficient in knowledge on this point, if I may judge by a recent conversation with one of the most noted. He confessed entire ignorance as to the cause of this deterioration. Dr. Black pointed out the cause and the remedy, and I have always felt thankful to him for so doing.

I can also support his statement, that ammonia kept in proximity to foil will change acid conditions and thus prevent any deposition upon the surface. Its use has always been attended with the best results. It is especially valuable to those situated long distances from centers of manufacture. Those under my teaching who have settled in Europe, and have adopted this mode of protection, have been enabled to use the cohesive gold with entire satisfaction.

Dr. N. W. Kingsley then read a paper upon "The Causes of Irregularity in the Development of the Teeth."*

The reading of Dr. Kingsley's letter elicited the following animated discussion:

Dr. J. E. Garretson, of Philadelphia. It would certainly, gentlemen, be doing a very superfluous thing to make any supplementary addenda to this paper of our respected friend. If all of you feel as thankful to him for the information that he has afforded us, and for the patient work he has done, as I do, I think I may say that he should consider himself rewarded, at least in part, for the effort he has made. And yet, strange as it may seem, I have had an experience scarcely in accordance with certain of the conclusions enunciated in his exhaustive paper.

I remember that some time since Dr. Jas. W. White, who, by the way, has made quite an extensive series of observations in a direction similar to those of Dr. Kingsley, queried with me in the beginning of these experiments as to whether the shape of the mouth had anything to do with force in character, and I at once replied that I thought a deep arch indicated lack of mental force. It seems a remarkable thing that it had come in the line of my observation to see many persons of inferior development having these deep and irregular mouths, and so I thought myself not without data in asserting that deep and triangular mouths are associated with inferior mental organizations. With such answer to his query on my part, Dr. White started out on his observations, to come back, however, very shortly, saying to me, "You are entirely mistaken." His observations had agreed with the experiences of the paper which has just been read. This, at any rate, may suggest to us the necessity for caution in stating a proposition in this direction, and the desirability of withholding a positive assertion of opinion until one has reliable data on which to base opinion. Now, I think I am prepared to forego my own observations and give the preference to those of our friend Kingsley, as being more extensive and made after the proper manner. My own were made entirely "*en passant*," not being based on any intention of searching out either a fact or a law. Both Dr. Kingsley and Dr. White have dissected their conclusions, and we seem forced to accept them. But the paper just read contains one paradox, or at least a seeming paradox. So great a one, in fact, that I must infer I have misunderstood the reader, so I will beg to be allowed to ask a single question:

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* This paper was published in the DENTAL COSMOS, April, 1875.

Did I understand the gentleman to say that the premature extraction of deciduous teeth has nothing to do with irregularity in the second set?

Dr. Kingsley. No; if you did, it was a mistake. I say the extraction of the deciduous teeth will certainly, under the present condition of society, ultimate, in almost every case, in the canines being thrown out of line.

Dr. Garretson. I thought I must necessarily have misunderstood the gentleman; there seemed in his premise, as I understood it, such a lack of congruity with the general character of his paper.

Dr. Kingsley has referred to the double teeth of Tom Thumb as indicative of the fact that an interference with physiological progression is the cause of irregularity. I remember that some time since one of the gentlemen connected with a dental college made a remark of this kind: "Certain people," he said, "who speak without thinking, have unwisely asserted that irregularity is markedly associated with hereditary transmission."

Now, this struck me as a very strange remark; and its author, I thought, might just at that moment have off his own thinking-cap, because all observations go to show that irregularities seen in one generation will be very apt to be found transmitted to that succeeding.

I am not entirely prepared to agree with Dr. Kingsley, that the nervous irregularity to which he refers has so much to do with irregular development of the teeth, and for the reason that I find everything guided and influenced by a principle. Certainly all matters which pertain to the development of a human being are so guided and influenced, and if nervous irregularity is the cause of irregular dental development, I cannot but ask myself why there should not be errors as well in the development of the cheek, or why one nostril should not be out of line, etc. But I can agree with Dr. Kingsley in the inference he would naturally make, that nervous disturbance—the prostration of nervous force—has immensely to do with that quality of the teeth, and with that tooth-substance with which, in an after-period, our profession so intimately brings us in contact. As it has been happily said, "We are only in the infancy of our profession," and this I for one recognize so well, that I fear I have not the patience I should have when I hear gentlemen enlarging too exhaustively upon dental mechanism as constituting the *summum bonum* of the specialty. Here is a great matter to which the paper may well serve to call our attention,—appreciation of that which constitutes the science of the specialty.

I cannot but think our time would be better employed, generally, if spent more in studying causes. I take my seat, repeating my thanks to the essayist for the double character of lesson afforded by his most excellent paper.

Dr. W. H. Atkinson. The time given is hardly sufficient to awaken an interest in the vast subject that has been broached before us. Before I proceed to a discussion of the subject itself, I want first to compliment this body upon having a member able to present us with such a production, and secondly, to make my own personal acknowledgment for the benefit that I have derived, and for the light that has been thrown upon the details of a subject that has interested me all my professional career.

Now for criticism: the title of the paper is "Causes of Irregularity." There is the rock of offense, there is the bone of contention, whether it be cause or causes that we are dealing with, and whether cause can be anything but absolute and infinite, and whether causes are not always simply sequences or successive presentments of the activity of that one infinite cause that lies behind the whole. When you have a plurality of causes, you have not reached the primary; so you see, that, according to the scope of the paper, we have the whole law of evolution—the whole law of development—brought before us, involving all the differential order of scientific presentment in organic relation. Now, who shall lay down the alphabet of first principles in this matter, to enable us to travel with some degree of certitude (or else not travel at all), until we shall have laid the corner-stone and foundation of what evolution is? In the first place, if we say *evolution*, we have invoked *involution* prior to that.

He struck the key-note when he gave neural influence as the origin of all function in mammalia. But the origins to which he traces certain effects are origins only in a very modified sense. It may have been the origin in the particular case he had in mind, but not the typal and absolute origin. In the study and investigation of morphology and embryology, what do we see to start with? A simple folded tract in the little bleb of super-oxydized hydrate of carbon, which begins by enfoldings and reduplications of enfoldings, and we find that this little groove, or tract, or canal, is the basis from which all the rest sets out: in other words, a focus of type possibilities of individual existence. What more have we? Namely, this, that if this is placed under enabling circumstances, supplied with the vivifying sperm, its development may be carried forward to the perfection of typal organization. Have we any such personal perfection? No, sir, and there has been only one case on the face of the earth that was developed according to the possibilities of the type which was coiled up in that bleb of oxyhydrate of carbon. But by that very example we see there is a type by which we may get perfection of development if coincided with.

In the schools for idiots and imbeciles we have learned that even the poorest are capable of being improved to a certain extent. And how is it done? By supplying the pabulum,—the enabling circumstances,—so that this type can express itself; and then we get not only the physical presentment, but the mental endowment. There is where the paper follows too much the "old fogy" method,—dividing the physical and mental as being separate and distinct. Even in a rock there is intelligence; even a crystal knows when the law of its typal proportions are fulfilled, and you have in silex the typical six-sided crystal. We have not understood what was involved,—that it was endowment of power in elementary substance. We have not understood the proper and normal primary relations of things. When the cerebral vesicle divides into its normal type of fissures and clefts, we then have the neural sheet, the vascular sheet, and the muscular sheet; and in this neural sheet the teeth have their origin.

The teeth are dermal structures. They are epidermic, endermic, and hypodermic. In the pulp there are produced vessels and nerves by a successive supply of the elementary bodies, which are blood-corpuscles, which constitute the soft-solids of the tissues. When any irregularity of arrangement of these elements takes place, it is because we have interfered with the alternation of generation in the cells of these tissues.

There it is that we shall find the cause, or rather the expression of the cause, of disturbance in the formative process.

I have repeatedly been blessed with complete reproduction of nerve-tissue, but have never seen reproduction in muscular tissue. A development of a higher expression of mental power is not affected by a waste of animal development. There is no such thing as a superfluous development of something that is heterogeneous. You might just as well say that pathology is death. It is not death, but a measure of physiological activity less than the full requirement of the type.

In the artificial incubation of the chicken, by breaking the eggs at various stages and under various conditions, we are able to see that there is one expression that is capable of being interfered with. Development will not go on below ninety-five degrees Fahrenheit, or above one hundred and five degrees. You must keep within these ten degrees of the thermal scale in order to secure incubation. Beyond that you never can get a proper form of tissue.

Now, the causes that we discern here as influencing development may be the immediate,—I will not say cause,—the immediate condition of the interference with development; and it is in these interferences with the condition of development that we get into difficulty. If you would do anything in the way of reproduction of tissue, you must remember that all tissues are reproduced on the same plan that they were originally produced.

Dr. J. H. McQuillen, of Philadelphia. I wish to express the pleasure I have derived in listening to the admirable paper just read to us; it is very rare for a communication of such length and of such detail to command the attention which it received and is justly entitled to.

I shall not undertake to pass in review and discuss the various points presented, but will confine my attention to the consideration and applications of an opinion expressed by me some time ago, which Prof. Kingsley has regarded of sufficient importance to quote in his essay; viz., "That when looking at an anatomical preparation of the jaws of a young person" (such as that being passed around the room), "and observing the crowded condition and irregular positions of the crowns of the permanent teeth in the jaws, with the deciduous teeth still *in situ*, it is not a matter of surprise that there should be occasionally irregularity of the permanent set, but rather of astonishment that they should ever come in regular."

Conclusive evidence is thus presented of the necessity of a decided increase in the size of the jaws to afford sufficient room for the permanent teeth upon erupting to form a perfect and symmetrical arch. There is and always has been an opinion prevalent on the part of the profession that the premature extraction of the deciduous teeth induces *contraction* of the jaws and causes irregularity of the permanent teeth. Mr. Charles

S. Tomes, of London, in an address before the alumni of the Philadelphia Dental College, February, 1873, opposed this opinion, and cited a case that came under the care of his father, John Tomes, F.R.S., in which all the deciduous teeth were prematurely extracted from a child, yet the permanent teeth came in perfectly regular.

My esteemed friend, Dr. Isaiah Forbes, of St. Louis, previously to this had directed attention to the fact that the premature extraction of the deciduous teeth does not produce contraction of the jaws, in the *Missouri Dental Journal*, and an acknowledgment of this fact was made by Mr. Tomes in his address.

Years ago, in lectures to my students, and in the DENTAL COSMOS, I took exceptions to the prevalent opinion, and directed attention to the fact that the premature extraction of the deciduous teeth does not necessarily induce contraction of the jaws, but that the *loss of these teeth was calculated to prevent the full development of the jaws; as the growth of a part is dependent upon its use.* The large development of the biceps of a blacksmith and of the gastrocnemius of the ballet-dancer is due to the constant use that they are subjected to. That which is true of muscle is equally true of bone, and the bones of those who labor, as a rule, are larger, more compact, and better developed than those of persons relieved from daily toil. As evidence of the wasting of tissues from want of use, it is only necessary to direct attention to the self-inflicted penance of the Fakirs in India, who, with an arm uplifted to heaven, and maintained in that position for years, have, as a consequence, in a short time, a wasted and shriveled condition not only of the muscles and other soft tissues, but even of the bones of the arm. It necessarily follows that the premature extraction of the deciduous teeth must interfere with the proper *use of the jaw*, and, as a consequence of want of use, insufficient increase of size takes place, and along with this comes irregularity of the permanent teeth.

Irregularity of the teeth in our country no doubt also results from the peculiar and mixed character of the origin of our people as a nation. Races from all sections of the earth come here to find a home, and intermarry with each other. Some of these, as the hardy people of England, Scotland, Ireland, and Germany, simple in their habits of life, and accustomed to coarse, hard food, have large jaws and large teeth; others, as the Italian races, generally with more luxurious habits and accustomed to softer food, have as a rule smaller jaws and teeth. Intermarriages, occurring under such circumstances with the representatives of these opposite nationalities, give us peculiar forms of irregularity:—small jaws, with large teeth in the most crowded and irregular condition, or large jaws with small teeth at a considerable distance apart. In addition to that source of irregularity, we have another prolific one in the fact that our children are indulged in improper habits of diet. Little or no restriction is placed upon their wishes in this respect; they are not compelled, as they should be, to feed upon the coarse food which forms a principal part of the diet of the children even among the higher classes in England, Scotland, and Germany. The necessity of feeding children upon oat-meal porridge, wheaten grits, hominy, and other cereals containing the bone- and tooth-forming constituents, cannot be too strongly impressed upon the minds of parents. In respect to the influence of the trigeminus in the development of irregularity of the teeth, there may be something in it,—to what extent I am not prepared to say. As we have found the use of a part has much to do with its growth, so the nutrition of a part is mainly dependent upon its nervous connections; and there is nothing more evident, so far as experiment is concerned, than the influence the trigeminus has on nutrition. Experiment upon experiment has demonstrated beyond a possibility of doubt that when section is made of the ophthalmic branch of the fifth pair of nerves, the nutrition of the eye becomes quickly affected, and we have in a short time irritation, inflammation, and a subsequent softening of the parts and loss of sight; and it is reasonable to infer that any impairment of the branches passing to the jaws may exert a deleterious effect upon the growth of the jaw and thus tend to the development of irregularity of the teeth.

Dr. John B. Rich. The paper just read by Dr. Kingsley goes far beyond the scope of my research in this particular direction, and, as the cause of the irregularities of the teeth has always been an interesting study to me, I most heartily thank him for the valuable information and suggestions his paper has presented to my mind. He tells us that the proper way to remedy the irregularities of the teeth is to attend to the physical education of children. From the manner in which this point is stated, I am led to think he is not aware that defective physical culture has been the primary cause of the phenomena he has met with in his investigations of this important subject.

I am an enthusiast on the subject of physical education. In the early part of my life, when a student in Paris, I devoted daily a large amount of time to its culture, and gave considerable thought and labor to the production of a system by which it could be properly taught.

On my return to this, my native city, the evident lack of physical development in a majority of my fellow-townsmen who came under my observation, became a source of painful contemplation to me, and the little attention that was paid to a matter of such vital importance surprised me.

Whenever I met any of these half-developed people I felt a desire to do something, if it were ever so little, towards remedying this mal-condition. As years passed by, and my observations were more extended, the evil effects of this peculiarity became more apparent, and the desire to do something in this direction grew stronger and stronger with me. Eventually I established an institution in this city exclusively devoted to systematic physical training and to teaching the general laws of health, and I maintained it in operation for several years.

Among the large number of persons of both sexes and of all ages who attended this training-school, I had ample opportunity to investigate the subject of imperfect development. I propose to make some remarks upon the relation of physical culture with the subject of Dr. Kingsley's paper.

From extended observations, made under favorable circumstances, I have come to the conclusion that at the period of early childhood no one part can be well developed where there is not a fair development of all the other parts of the system. As few of those mothers who live in large cities take sufficient general exercise during pregnancy and the period of nursing to produce a vigorous condition of health, those parts of their offspring that are formed under such conditions cannot be of good quality. Therefore the primary cause of the defective structure of the teeth and the irregularity of their arrangement is the result of the bad condition of the physical powers of the mother at the time of her pregnancy with and lactation of the subject of these defects, producing an imperfect physical condition of the offspring while the teeth are being formed. Although the defective quality of the teeth and the evils which follow such construction cannot be entirely overcome, happily for the child, the delicacy of the rest of its system and the tendency to irregularity of the teeth can be changed by proper regimen and thorough physical culture persistently applied from early childhood to full maturity.

Were such means always employed under such circumstances I do not believe we would ever see imperfect arrangement of the teeth; and I have often thought what a vast amount of good to our race could be brought about if every dentist would become a missionary in the cause of physical education.

It is his legitimate province to impress upon those who come within the scope of his influence the great importance of physical culture and a proper regimen, to produce robust health in those who are likely to become mothers, for he, above all others, has constantly before him the evils resulting from a low condition of health under such circumstances. Let him also, whenever he has an opportunity, endeavor to impress upon the minds of those who have transmitted delicate teeth to their children, the urgent necessity of eradicating, as far as possible, those deleterious properties, by building up the systems of those young lives so afflicted.

One of the errors that our population suffers from, because it leads to the certain deterioration of our race, is the general desire of American parents to foster in their children a precocious mental development, oftentimes to the entire neglect and consequent destruction of their physical systems. Here the dentist, when called upon to examine the teeth of such children, has the opportunity to give his advice and say to the fond mother who is so proud of her bright but delicate child, "Madam, repress that undue mental growth, and exert all the means in your power to give this dear child a robust constitution and good physical development. Its teeth teach me that is now its greatest want; give it plenty of bodily exercise in the open air, and let its mind alone." And this reminds me that one of the experiences of my physical school bears directly upon this point, which was this: that when I attempted to build up delicate systems, no progress towards a satisfactory result could be made until all serious mental occupation or culture was abandoned; this was the case with adults as well as with children, and in many cases it became a matter of paramount importance that the mind should cease all labor and be turned into recreative channels.

I spent a portion of my life in parts of Asia, Africa, and among those nations who live on the borders of and the regions around the great desert of Sahara. Some of these nations are only semi-civilized, and many of these people spend the greater part of their lives in the open air, and from their simple diet, and the large amount of bodily exercise they take, splendid physical development is almost universal, and cases of defective structure or arrangement of the teeth are scarcely known among them.

To exemplify what may be accomplished by careful systematic training, I will mention one of the performances of a class I had in training in the institution I have spoken of. This class was composed of ladies of all ages, and they met for instruction and practice three times a week; most of them belonged to the wealthy portion of society, and a majority of them were confirmed invalids when they joined the school.

When they had been in training about eight months, I wished to test the progress they had made, and without telling them that what they did that day was to be considered as a test of their improvement, I commenced the experiment of their endurance. I had constructed around the verge of the main room, a pedestrian track five feet wide, and the twenty-fourth of a mile in circumference. On this occasion all the members of the class who were present (and there were but few absent) ran in regular cadence step five miles in forty minutes. Not one of them left the track while this was being done, nor were they the least blown or fatigued at the end of the task. So easily was this done that they did not realize that there was anything extraordinary about the performance. But there was something extraordinary about it, and when I told them that they were the only women in this city who could run that distance in the time mentioned, they were very proud of their performance. Now, when it is considered that these women were from those classes of society where the general habits of the women are such as would tend to render women unfit for any extraordinary physical feat, this performance illustrates what may be accomplished by properly applied systematic training, even with those who at the commencement are in a delicate condition of health.

And I am of the opinion that the only way to successfully cope with those great and growing evils, imperfectly constructed and irregularly arranged teeth, is by directing attention to the necessity of improving the physical condition of those women who are to be the mothers of the generation still to be born.

Dr. T. C. Stellwagen, of Philadelphia. Through the kindness and courtesy of Dr. Bogue I was informed of the subject to be discussed at this meeting. Living in the neighborhood of a very large training-school, the Pennsylvania, and being personally acquainted with its superintendent, Dr. Kerlin, it seemed well to embrace the opportunity to examine the mouths of the inmates of this institution, without any theory either to make or unmake. I am very happy to say that what little I saw and what little experience I had there precisely confirms the views of Dr. Kingsley, which we have had given to us this afternoon. In the course of my examinations (which were rather hastily made, from the fact that I first wished to take a general view of the inmates and afterwards particularize), I found that in all I examined the mouths of ninety-seven males and eighty-seven females, making in all one hundred and eighty-four patients. Among these there was a very small percentage that, had they been presented to me in my office, would have warranted interference, in any manner, as regards the regularity of the teeth.

I then re-read the paper of Dr. Langdon Down and the subsequent paper of Dr. James W. White, and found my examinations, though hasty, fully confirmed Dr. White's, which were made more carefully and with measurements.

The teeth of the inmates of this institution were generally unusually fine, if we make certain exceptions,—first, we must expect, inasmuch as many of them were so imbecile in mind as to be incapable of even feeding themselves, to find neglect and uncleanliness; secondly, there was an unusual number of incisor teeth absent from the mouths of those that had advanced to the age of fifteen or over. I was first conducted into the nursery, where the most hopeless cases of idiocy are kept, and in the very first examination found that the lateral incisors were wanting, and that the canines particularly looked unusually sharp and somewhat stunted in growth. The question at once forced itself upon my mind, possibly here was a peculiarity that had not been reported? but, on a more thorough examination of a greater number of cases, this did not hold true. There was nothing remarkable as regards irregularity. The jaws wêre unusually large, as compared with the same number of jaws in the mouths of intelligent children—such as would seek the services of the dentist,—and the loss of the incisor teeth was readily accounted for by the fact that in their paroxysms of rage, and even, as it seemed, at times, from a sort of delight in inflicting pain on themselves, they had broken out many of these organs. I considered their mouths remarkably well developed. As Dr. Kingsley has already remarked, the predominance of the animal over the mental was probably assisted by a good masticatory apparatus; so that they could properly prepare their food and be benefited by it.

Dr. C. N. Peirce, of Philadelphia. I have listened with extreme pleasure to the reading of Dr. Kingsley's paper, and more particularly have I been interested because its subject is one to which I have given some little attention. First, in reference to irregularity occurring from premature extraction of the deciduous teeth and abnormal development of the posterior part of the jaw. While I understood the author to recognize fully the unfortunate results from the premature extraction of the deciduous canines, I did not think he gave due weight to the consequences arising from such loss of the second deciduous molar. The first permanent, or what is termed the sixth-year molar, erupts so much in advance of the second bicuspid,—which is the successor of the deciduous molar,—that the latter, if prematurely extracted, has the space invariably occupied by the permanent molar, thereby throwing the bicuspid either upon the lingual or buccal side of the alveolar ridge. Again, in the development of the jaw, growing as it does by adhesions to the posterior part of the ramus of the jaw and absorption of the anterior part, we may have, by a suspension of this latter normal condition, a deficiency of room, and as a result that distressing and embarrassing condition, the displacement or non-eruption of the second and third molars. This manner of the growth of the jaw I had fully demonstrated to me a little more than a year ago, when I had the pleasure of visiting Dr. Tomes, of London, and accompanying him to his lecture-room and museum. He showed me two jaws, one with the ramus almost completely removed, leaving but a line of the posterior edge and a trace of the condyle. Here was absorption progressing normally without a corresponding development or growth at the posterior edge. In the other was the reverse condition,—development had progressed normally, while absorption had been arrested; as a result, the ramus was double its natural width, and in consequence thereof, there was an absence of space for the regular development of the permanent molars. Now, a few words in confirmation of the views expressed in the paper upon the correspondence between the development of the jaws and teeth and mental capacity.

While traveling through the Tyrol of Southern Austria, and Lombardy, in Italy, I had, as had the author of the paper, the opportunity of seeing a large number of Cretins,—disgusting, jabbering idiots as they were, unable to articulate a word distinctly. By the aid of a few small coins I obtained a hasty glance at the oral cavity; which, though not critical or satisfactory, was sufficient to satisfy me of an unusually large development of both superior and inferior maxillæ, with an abundance of room for the teeth. Opportunities have also not unfrequently offered for viewing the mouths of negroes, where mental growth was far below the average, with a decidedly retreating forehead; in such, the jaws were invariably large, the teeth far from crowded, and quite projecting. In my regular practice, cases have not unfrequently occurred where one or two in a family would have what might be termed *straggling* teeth, or teeth standing alone with an unusually wide space between them; while with other members the reverse condition would predominate. In the former the mental condition was always far below the latter, being a marked reversion to a lower order of development. Mr. Darwin, in his work on the "Descent of Man," speaks of the long and prominent canine "as a case of reversion to an ape-like progenitor;" and remarks, "that he who rejects with scorn the belief that the shape of his own canines, and their occasional great development, are due to our early progenitors having been provided with these formidable weapons, will probably reveal by sneering the line of his own descent; for, though he no longer intends nor has the power to use these teeth as weapons, he will unconsciously retract his snarling muscles, so as to expose them ready for action, like a dog prepared to fight." Those who have studied the normal condition of the teeth recognize the fact that they are of one height, or represent an even line on their masticating and cutting surfaces; so that placing a jaw with teeth so developed upon a plane, each tooth rests with equal force upon said plane. Now, occasionally we find, as Darwin describes, not only a projecting, but an elongated canine; wherever I have found this, the other teeth have had spaces between them, with other marks corresponding to a lower order of development, and confirming the views advanced in the paper under discussion.

It was my privilege some years ago to make monthly professional visits to an asylum, many of the inmates of which were epileptic; with these I had principally to do, and I now distinctly recall the crowded and irregular condition of the teeth, which frequently embarrassed, and at times almost baffled, my efforts. These were patients with no congenital mental deficiency, but quite the reverse,—large and well-developed heads, with a predisposition to nervous disturbance, was the rule, and not the exception, with several families, branches of which were under my care both in and out of the asylum.

With these hasty confirmations of the ideas advanced in the paper just read, which has given us so much information and pleasure, I must pronounce it one of the finest contributions to dental literature I have ever heard read.

Dr. W. H. Dwinelle. As has been suggested by Dr. Atkinson, Dr. Kingsley has struck the key-note to a new, comprehensive, and grand idea. I for one congratulate myself that I am an American, that Dr. Kingsley is an American, and that it has been reserved for this side of the Atlantic to strike at the *root* of this matter, and demonstrate and establish it. We are talking about teeth, and the term *root* is not altogether inappropriate.

I have endeavored, through the teachings of my own experience and observation, to form a theory of hereditary transmission, which would account for general irregularity of the teeth, and which I may refer to hereafter, but I am satisfied that in most cases my data were gathered from incidental or exceptional cases, and that the general rule must be the one which Dr. Kingsley has so ably exemplified here to-day; certainly he has in a large degree brought order out of my chaos. I think if the matter under discussion were to be expressed in a single phrase, it would be "inharmony of development."

We have certain organs with certain functions, other organs with other functions, and when they are working together, and yet inharmoniously, we have incompleteness, discordance, and irregularity. One of the chief functions of the trigeminal nerves is to develop the teeth, while the function of the osseous structure is to produce the basis upon which the trigeminus shall place and arrange the fruits of its labor. One produces results of a comparative standard character, while the product of the other is variable and fluctuating. There is inharmony and want of concert of action in cases of irregularity between the foundation and the superstructure; the superstructure is too large for the foundation: the superstructure is standard and normal, the foundation is small and abnormal.

Should we ever adopt a mythology of our own, the god Trigeminus would be the divinity whom we would propitiate, for he presides over the organs which make our profession possible, and is the good genius who has developed our calling into a science and an art, and under whose smiles of welcome and whose approving and protecting wing we have gathered here to-day.

I invariably associate irregularity of the teeth with high living, high intelligence, and an excess of the mental and nervous over the physical. Where the physical has been fully developed, the teeth, as a rule, fall into their regular line in the arch.

Allusion has been made to the case of Tom Thumb. Here is a striking instance where a contracted arch has resulted in irregularity of the teeth,—the teeth, being fully and normally developed, of necessity could not come in, except in a double line.

In the case of the giant,—except with those who belong to a race o giants,—where the foundation is large and abnormal, the teeth being of normal size, of necessity cannot fill the arch, and large intervals are left between them. Precocious tendencies in the individual are apt to find expression in the development of the teeth.

The general cause of irregularity of the teeth, as has been indicated, arises from the development of the nervous and brainial at the expense of the physical, inducing also in its train of evils paralysis, apoplexy, softening of the brain, and brain affections generally. In an article on "Brain Difficulty," published in one of the foreign quarterlies a few years ago, it was demonstrated that there were more affections of the brain and nervous system in the city of New York, in proportion to the number of its inhabitants, than in any other city in the world. We stimulate our energies too far, we overtax our brains and give ourselves little or no recreation, we carry our business home with us, and merge the perplexities of our worrying cares into nightmare dreams. Death comes to us suddenly, unnaturally, and before our time, and our posterity is cursed with a sad inheritance, the sure penalty of outraged physical laws.

The remedy for irregularities of the teeth in the future must be associated with such measures as have been recommended here to-day; the mechanical correction of such deformities, so as to arrest so far as possible their tendencies, and then to cultivate all influences which shall re-establish the harmony between the nervous and physical system.

From Dr. Kingsley's paper I make the following digest or series of deductions. That irregularity of the teeth arises from three causes:

First. During the life of the individual, owing to a cerebral disturbance while the teeth were forming.

Second. If antedating that individual life, it arose from like causes, transmitted.

Third. Arising from mixing inharmonious types, large teeth with little jaws.

The teeth of idiots may be divided into two classes:

First. Where there is a fair physical organization, with very low but progressive order of intellect, the teeth and jaws are normal.

Second. Absolute idiocy, associated with general physical disorganization,—teeth and jaws included,—the whole system wrecked, belong to no order, and are mere *lusus naturæ.*

(To be continued.)

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

A STATED monthly meeting of this association was held on Tuesday evening, March 9th, the President, Dr. Spencer Roberts, in the chair. "Deciduous Teeth" was the subject for discussion. The numerous practical suggestions of the speakers, and the close attention of the audience, combined to render the occasion one of unusual interest. The following embraces the practical points of the discussion:

Prof. Buckingham. The treatment of the teeth of children is not a very desirable part of our practice; of course we prefer older persons for obvious reasons; still, it is a matter of a good deal of importance. We rarely are called to treat deciduous teeth until after they are all erupted, as, before that time, the physicians are usually consulted.

My practice is to fill them when it is necessary to do so, but not with gold. I generally prefer using tin, especially in the back teeth. If the child is seven or eight years old, I frequently use Hill's stopping or oxychloride of zinc, and occasionally amalgam. I do not like to use amalgam very often in these cases, because when they come into one's hands the cavities are large and the pulps frequently dead, so that any filling is liable to cause trouble, and if amalgam is used the trouble is usually ascribed to that. It is a question whether we interfere with nature if we extract the deciduous teeth before it is time for them to be replaced by the permanent ones. Tomes says the jaw does not contract. Sometimes, of course, we *have* to extract, but my plan is to save the deciduous teeth whenever I can. There is often difficulty with the first permanent molar. Townsend recommended filling these teeth with tin temporarily, and refilling with gold a few years later, when the structure of the tooth has become more dense. These fillings must usually be temporary, on account of its frequently being impossible to keep them dry, for, as the rubber dam cannot often be used, we have to rely upon napkins. Sometimes we can relieve pain in the temporary teeth, and I have applied a small quantity of oxychloride of zinc, keeping it in twenty-four hours, and then excavating and treating as in ordinary cases.

Dr. Huey. I desire to indorse emphatically what Dr. Buckingham has said in regard to tin as a filling in "deciduous teeth." It is easily manipulated, and may be worked successfully, even where moisture is present, consequently, we are more likely to make a good operation with it than with gold in these cases. I rarely use gold in the deciduous teeth, preferring tin, Hill's stopping, red gutta-percha, and amalgam; using the second whenever possible, and filling over with either tin or amalgam. Where caries has proceeded to such extent that the pulp is only protected by softened tissue, it may usually be made comfortable by leaving a layer of decayed dentine over the pulp, and applying a pledget of cotton saturated with a solution containing equal parts of the sulphate and acetate of morphia in creasote, and filling over with Hill's stopping or gutta-percha. For *ordinary cases* tin is invaluable.

In answer to a question as to the different therapeutic effects of the sulphate and the acetate of morphia, Dr. Huey said: The acetate seems to be more readily absorbed, diminishing sensibility and power of action at once. The sulphate not being absorbed so rapidly, is a reserve force by which the effect is continued, and, if in close proximity, will often painlessly destroy the pulp. The acetate is a better remedy for sensitive dentine. When it is necessary to destroy a pulp, it may be done usually with entire freedom from pain, by applying the double morphia solution for a day or two, and afterwards nerve-paste.

Dr. J. H. Githens. I use the red gutta-percha (such as is used for base-plates); it is very tough. Have some fillings of it that have been in four years. I also use tin-foil, if the walls of the cavity are strong enough to bear the necessary pressure, and sometimes use amalgam.

Dr. Milton Keim. I have not been as successful with red gutta-percha as I desire, probably owing entirely to my ignorance of the proper manner of manipulation.

Dr. Huey. To pack red gutta-percha successfully, the *packing* instrument should *not* be heated, and should have a very slight trace of glycerine over the surface.

Dr. E. H. Neall. I endeavor to save the deciduous teeth as long as possible, as I believe the growth of the jaws depends largely on the condition of the teeth. If the temporary teeth are lost too early, the second teeth are liable to come through the gums before nature intended, and they will also assume a wrong position. By the too early extraction of the second temporary molar, the sixth-year molar is liable to come forward, so that after the incisors and bicuspids are in place there will not be sufficient room for the canines, which will be forced out of the arch, causing great disfigurement and considerable difficulty in correcting.

Have also considered it a duty to frequently examine children's teeth after the temporary teeth are in place. Where slight decay has occurred in proximal positions, have removed it by filing, or more recently with the corundum-disk; where decay has made further progress, I have filled with Hill's stopping and red gutta-percha, renewing when necessary. In preparing nerve-paste, I use the acetate of morphia, as it appears to possess properties more agreeable to pulp tissue than the sulphate.

Dr. Huey. Another trouble caused by the too early extraction of the deciduous tooth is the too rapid eruption of its permanent successor, with enamel imperfect. Such teeth are sometimes entirely destroyed before the eruption of the second molars.

Dr. Wert. I have seen these early erupted teeth perfect and later eruptions defective, so I do not think this reason of Dr. Huey's will hold good in all cases. As regards materials, I have used oxychloride of zinc very satisfactorily, and when the cavities are large in molar teeth and pulp nearly exposed, I use Hill's stopping as a capping and amalgam on top, and find it answers a very good purpose, avoiding much pressure; consequently, in these cases the plastic materials are valuable. I believe tin to be one of the best, if not *the best*, material for the preservation of tooth-structure. Gold is a better conductor than tin, and for that reason more objectionable for these teeth. When tin fillings have been removed after they have been in for many years, I have usually found the walls of the cavity white and in good condition.

Dr. Keim. I have seen amalgam fillings that Dr. Townsend put in twenty-five and thirty years ago, and they were bright and in perfect condition.

Dr. Huey. I saw a tooth to-day that had been filled thirty-five years since with amalgam, and it was in good condition.

Prof. Buckingham. I think we might get better gutta-percha fillings than Hill's stopping, and at much lower cost. Gutta-percha dissolved in chloroform, with a little silex added, makes quite a good cement. Hydraulic cement has also been used in connection with silex, and as that will set under water, it would be very good.

Dr. Wert. When children come to us crying with toothache, what must we do? We must relieve suffering when it is in our power so to do. Have heard it said that we should never extract; but we must, to a certain extent, accommodate ourselves to our patients. If it be a living tooth with pulp exposed, it may be relieved; but if it be a molar, dead and discharging, I would not consider it malpractice to extract as the surest means of relief.

Dr. Neall. I would rather a child would suffer than lose the teeth.

Dr. Joseph Pettit. The fact that children have defective teeth is greatly due to improper diet, both of the children themselves and of the mothers.

Dr. Huey. The diet of children should include corn, oatmeal, unbolted wheat, or any prepared grain not deprived of its proper seed-coat or bran, as this is the source whence is obtained the mineral constituents of the teeth and bones. We see the best teeth in Scotland, where the diet of the people is composed principally of oatmeal, which contains a large percentage of mineral. Leibig says, "There is as much nutriment in Scotch oatmeal as in the best English beef."

There is a case of a child who, before the age of two years, began to lose its teeth. Previous to the birth of another, phosphate of lime was administered to the mother, and the teeth of the second were well developed.

Prof. Buckingham. No doubt bran-flour would make better teeth than fine flour, but if the Scotch have better teeth than others, it may be accounted for by the fact that they have healthy parents. Children are likely to die there unless they are healthy, consequently there is good stock to breed from.

Dr. Keim. I always make the effort to preserve temporary teeth; but if there is ulceration, and it remains after a fair trial of the usual remedies, there may come a time for extraction, as the diseased condition may injure the germ of the incoming permanent tooth. A patient of mine, aged four years, had (the result of an accident) an ulcerated left central incisor. After the usual remedies had been persevered in for over two years, I thought it best to extract; was led to do so by fear that necrosis might result.

The child was aged six and a half years at the time of extraction. The corresponding tooth of the permanent set came in in less than ten weeks, of full size, but imperfect in structure. The sixth-year molars came at the seventh year; their structure is good. Proper attention was paid to his diet, and his general health is excellent. The patient, now aged eight, has but one incisor of the permanent set, while the deciduous one of the other side stands by it, looking quite odd.

Dr. Hellings. On the 15th of February, by request of the family physician, I was called to see a babe nine months old, to extract its teeth, all the incisors being erupted. The child had been fed from the bottle, and appeared to be healthy. On examination, I found but little inflammation of the gums. The crowns of the teeth appeared to be cartilaginous in structure, and so sensitive that it could scarcely take the nipple. The roots of the teeth were firm. I decided not to extract the teeth; and, recognizing the deficiency of phosphates, I directed that the child be given prepared food. I also lanced the gums. On the 23d, was again called in, and found the child had been greatly relieved for a few days, but had now again become restless. I lanced the gums again, and directed that they and the teeth be penciled with iodine three or four times a day. Saw the child again on the 8th of March, and found that it was greatly *improved* and rested well.

Prof. Buckingham. I have known of cases where the teeth decayed almost as soon as erupted. I account for it by the arrest of the processes of nature. These teeth are frail and not properly formed; they come through, with the enamel absent or defective.

JOSEPH PETTIT, *Secretary.*

AMERICAN ACADEMY OF DENTAL SURGERY.

AT a meeting of the American Academy of Dental Surgery, held in the city of New York on April 7th, 1875, the following officers were elected:

President.—Geo. H. Perine.
Vice-President.—A. P. Merrill.
Recording Secretary.—Geo. A. Wilson.
Corresponding Secretary.—J. Adams Bishop.
Treasurer.—R. P. Perry.

This association has for its object a higher standard of dental science and a better appreciation of skilled dental art; and seeks to enlist and draw out the latent talent of the young men in the profession, believing that on them is incumbent the duty and honor of making the dental profession *of the future* what it is capable of being made,—a satisfactory and remunerative field for the brightest intellect. It has a large and active corps of foreign and domestic corresponding members, from whom papers and matters of latest interest are being received.

Geo. A. Wilson, *Secretary.*

MISSISSIPPI STATE DENTAL ASSOCIATION.

Pursuant to call, a meeting for the purpose of organizing a State Dental Association was held in Vicksburg, Miss., April 21st. A constitution and by-laws were submitted and adopted, and the following officers were elected: Drs. J. D. Miles, *President;* A. H. Hilzheim, *First Vice-President;* O. B. Hilzheim, *Second Vice-President;* A. Riser, *Secretary;* J. B. Askew, *Treasurer*, and an Executive Committee consisting of Drs. Miles, Askew, and A. H. Hilzheim.

The association adjourned to meet at Cooper's Well, on the third Wednesday of August, 1876.

CHICAGO DENTAL SOCIETY.

The annual meeting of the Chicago Dental Society was held at S. S. White's Dental Depot, on Monday evening, April 3d, 1875. President, Dr. E. D. Swain, in the chair.

The election of officers for the ensuing year resulted as follows:

President.—Dr. C. R. E. Koch.
First Vice-President.—A. W. Harlan.
Second Vice-President.—J. A. W. Davis.
Recording Secretary.—D. B. Freeman.
Corresponding Secretary.—J. S. Swartley.
Treasurer.—M. S. Dean.
Librarian.—C. R. E. Koch.
Executive Committee.—J. L. Clapp, J. A. W. Davis, E. D. Swain.
Library Committee.—Geo. H. Cushing, E. D. Swain, W. A. Stevens.

D. B. Freeman, *Recording Secretary.*

PENNSYLVANIA STATE DENTAL SOCIETY.

THE seventh annual session of the Pennsylvania State Dental Society will be held at Cresson Springs, Pennsylvania, commencing Tuesday, July 13th, at 10 o'clock A.M., and continuing three days. Tickets can be obtained from almost any point, at regular excursion rates.

The Executive Committee has secured accommodations at three dollars per day, with the use of the chapel as a place of meeting, and announce the following essays and clinical operations: "The Lower Forms of Organic Life found within the Oral Cavity," by C. N. Peirce, D.D.S., Philadelphia; "The Electro-magnetic Mallet," by E. T. Darby, D.D.S., Philadelphia; "Dental Caries," by T. C. Stellwagen, M.D., D.D.S., Philadelphia; "Dental Therapeutics," by John Murray, D.D.S., Rochester, Pa.; "Dental Education," by Samuel Welchens, D.D.S., Lancaster, Pa.; "Hygienic Laws," by G. W. Klump, D.D.S., Williamsport, Pa.; "Operative Dentistry," by M. H. Webb, D.D.S., Lancaster, Pa.; Address by the retiring President, J. H. McQuillen, M.D., D.D.S., Philadelphia; "Illustration of the Use of the Electro-magnetic Mallet," by E. T. Darby, D.D.S., Philadelphia; "Operation, using the Automatic and Hand mallets," by G. B. McDonneld, D.D.S., Conneautville, Pa.; "Quick Wedging and Filling of the Incisor Teeth," by S. H. Guilford, D.D.S., Philadelphia; "Illustration of the Use of the Matrix in the Filling of Teeth," by F. Hickman, D.D.S., Reading, Pa.

J. H. MCQUILLEN, M.D., D.D.S., *President.*
M. H. WEBB, D.D.S., *Corresponding Secretary.*

MARYLAND DENTAL COLLEGE.

WE are requested by the Dean of the Maryland Dental College to correct our correction of the number of matriculates at the last session. We gave it originally as 24; then, on what we believed to be reliable authority, gave the number as 7. The Dean now asks us to say that the real number was 11.

EDITORIAL.

THE EDUCATIONAL PROBLEM.

WE publish in the "Periscopic" department of this issue of the DENTAL COSMOS a recent editorial of the *Philadelphia Medical Times*, as a contribution to the current discussion on dental education.

Under the title "Oral Surgery,"—the relation of which to the article does not clearly appear,—that journal once more favors us with its views of the "unworthiness of the dental profession, as it now stands, to rank as a branch of the medical fraternity."

We regret to learn from the article in question that, in response to previous editorials of the *Times*, "the editor of a usually dignified journal was betrayed into publishing an editorial of such a personal character" that the *Times* could not, consistently with its own self-respect, notice it.

Personalities in the discussion of such subjects are at all times to be avoided, and especially in reply to a journal itself so free from the fault as is the *Times;* and it is, therefore, with pardonable satisfaction that we point to the editorials of the DENTAL COSMOS on this topic, in which the only paragraphs open to criticism in this regard were inclosed in quotation marks.

We presented the views of the *Times* in full to our readers, and editorially called special attention to them, respectfully asking that journal to reciprocate by publishing ours. Nearly a year having elapsed since that request was made, we had lost hope that our request would be noticed, but we are happy that the *Times* has at last complied,—not only publishing our views, but adopting them, as will be seen by comparing our then position with its recent utterances.

OBITUARY.

RESOLUTIONS OF RESPECT TO THE LATE DR. F. R. THOMAS.

AT the annual meeting of the Association of the Alumni of the Pennsylvania College of Dental Surgery, the President, Dr. C. S. Stockton, in fitting terms, announced the death of our late fellow alumnus, Dr. F. R. Thomas, and, upon motion, Drs. Darby, James Truman, and Millard were appointed a committee to prepare appropriate resolutions in relation thereto.

The committee reported the following, which were adopted, and ordered to be inserted upon the minutes:

"It having pleased Almighty God, in whose hands is the breath of every living thing, to remove suddenly from the scenes of his toils and honors our late beloved associate, Franklin R. Thomas, D.D.S., it becomes our mournful pleasure to make record of his worth; be it therefore

"*Resolved*, As the sense of this association, that the subjoined memento be engrossed on the records of this body.

"Enthusiastic in his profession, skillful, experienced, and eminently successful in his own special department, affectionate in disposition, genial, urbane, and fascinating in manner, irreproachable in morals, Franklin R. Thomas was one whom we honored as a dentist and loved as a man. Profoundly lamenting his untimely removal, we gratefully rejoice in the memory of his many and brilliant virtues. Ourselves marching to the eternal world, we loiter for a moment on the busy highway of life to hang this garland on his tombstone."

JOSEPH PETTIT, *Secretary.*

DR. N. H. DREW.

Died, at Baraboo, Wisconsin, March 30th, 1875, of bilious pleurisy, Dr. N. H. Drew, in the forty-ninth year of his age.

Dr. Drew is highly spoken of by those who were associated with him, and they bear hearty testimony to his honesty, purity, and kindness of heart.

At the time of his death Dr. Drew was Vice-President of the Wisconsin Dental Association.

MR. EDWIN SERCOMBE.

We deeply regret to announce the death, on April 14th, 1875, of Mr. Edwin Sercombe, London.

Mr. Sercombe was identified with all the efforts to advance the specialty which he practiced, and his name will always recur in connection with the Odontological Society, and with the London Dental Hospital.

He is spoken of as a man of great thoroughness and earnestness of purpose, and of unimpeachable rectitude. The profession in England will deeply feel his loss.

PERISCOPE.

Oral Surgery.—Some months since, there were published in our columns certain editorials upon dentistry which gave rise to a good deal of angry private and semi-public criticism. As an example of much of this, we may be pardoned mentioning that a prominent member of the craft, whose sober opinion ought to be valuable, assured us in a public place, in the most solemn manner, and in the presence of numerous witnesses, that "the day will come when your children and grandchildren will point their fingers of shame at this and say, 'Father, or grandfather, did you write this?'" Finally, the editor of a usually dignified journal was betrayed into publishing an editorial of such a personal character that we could not at the time, consistently with our own self-respect, notice it, so that we let the matter drop. Our interest in the subject has, however, never been lost, and we have read with pleasure the able debate upon dental education which is contained in the report just published of the special meeting in December of the New York Odontological Society. We have not space for even a fair abstract of this lengthy discussion, but desire to call attention to several points in it. In the first place, it fully establishes the truth of all that has been said in regard to the unworthiness of the dental profession, as it now stands, to rank as a branch of the medical fraternity. Indeed, it does more than substantiate our words.

James Truman, D.D.S., of this city, in the opening address says that to-day "there are from eight to eleven thousand persons engaged in the practice of the profession [dentistry] who have not the degree [D.D.S.], and of whose general intelligence we have no means of knowing. It is very safe to assume that a large proportion are men whose attainments do not extend beyond the mere practical routine of mechanical operations, and a very large number are by no means experts in these directions. Generations must come and go before we can occupy the present favorable position of the medical profession." Later in his speech, Dr. Truman asserts that dentistry at the present time has no claim to be considered a specialty of medicine. Howsoever the dental profession may be divided on this point, we can assure Dr. Truman that the medical profession is singularly a unit in agreeing with him.

Broadly viewed, the gentlemen who took part in the debate were divided into two camps: those who argued that dentistry should exist as dentistry, and those who desired that it is or should be a specialty of medicine. We do not propose here to enter in any way into the discussion of what dentistry ought to be, but merely to point out that it is not at present a medical specialty.

In what seems to us the ablest speech made upon the occasion, Dr. Garretson, of this city, argued in favor of progress. He really expresses the whole gist of the relations between dentistry and medicine in the following sentence:

" Most decidedly am I, for one, in favor of the abolishment of the degree of D.D.S. One degree in medicine is enough; the greater covers the lesser, and includes it. A doctor in medicine possesses a title quite extensive enough in its signification to embrace any specialty that he may elect to practice; besides, it affords the only possible bond of brotherhood with the members of the profession at large. We may be specialists, but we can never be esteemed as doctors, in the desirable fullness of the term, until we replace the D.D.S with the M.D."

Let editors write as they may, conventions debate, discuss, or pass resolutions as they please, one thing is certain: that D.D.S. is the badge of a partial culture, and that the medical profession never will stultify itself by recognizing as coequal or as a part of itself a profession to the highest positions in whose ranks such a degree is the only necessity for entrance. It may do very well for gentlemen who place only their medical degrees on their door-plates before the world to affirm in convention that they prize the D.D.S. above the M.D., but in doing so they only make themselves singular : they do not affect or reflect the general public opinion. Those gentlemen who look upon dentistry as belonging to medicine should weigh well the words of Dr. Garretson. On behalf of the medical profession, we freely admit that many, it may be all, of the dentists who took part in the debate at the Odontological Society, far exceed, in point of general, literary, scientific, and even in special medical culture, many of our physicians. But that does not affect the question. The medical profession is perfectly willing to admit dentists to its fraternity so soon as they become doctors of medicine, but never whilst they are merely doctors of dentistry. Really, the physicians are, in great part, indifferent in this matter ; but just so soon as the universal law of the medical profession—that the specialist shall first be a general practitioner, and shall have no special degree—is complied with, the medical profession will at once assimilate this great new body.

The latter part of the following extract from the speech of Dr. Garretson has an application much beyond that which he made of it:

"It has come most plainly to exhibit itself, not only to ourselves, but as well to the community, that our field of labor does not correspond with our learning, our social position, nor, indeed, with pretensions necessarily associated with a title which we have arrogated to ourselves. We are very wrong in esteeming that in ill temper on the part of certain editors, or in crustiness of disposition on the part of other people, originate criticisms that some of us do not like to hear. The trouble is not exclusively with these; but these rather are as the voices which precede the whirlwind of public opinion; and not to give heed, is to exhibit little more discernment than the foolish ostrich, which, with head and eyes buried beneath the sand, esteems itself free of all danger."—*Phila. Medical Times.*

Specialties in Medicine.—Dr. Jacobi, Chairman of the Committee on the President's Address (New York State Medical Society), in his report made the following well-timed and just remarks on specialties of medicine, and we ask the attention of our readers to them.

"The general remarks of our president on the extinction of four hundred and fifty journals in the United States and Canada, and the unnecessary subdivision into specialties, ought not to go unheeded. It is a matter of sincere congratulation on the part of all of us that those four hundred and fifty journals died so early, when there was no nerve-center, no viability in them. Let us hope that many more of the same class will speedily fulfill their natural destination. We still have a large number of journals which express and contain nothing besides the desire of the editor or editors for notoriety, the title-page being the only original article, and the contents exhibiting the results of an active pair of scissors. Such publications, if they contrive to exist for any length of time, lower the tone of medical literature, demoralize particularly the younger members of the profession whose legitimate ambition and zeal are suppressed by beholding the facility with which notoriety is obtained, and diminish the chances of development on the part of better journals. This influence on the younger members of the profession ought not to be underrated. While they hope for success, they must look for the means of obtaining it. There are but few mortals whose ambition, both intellectual and moral, extends beyond the accomplishments and success of the best and most successful around them; but few who learn for the sake of knowledge, and work from inner necessity. Thus it is that so many of them are blinded by the success of older specialists to the manner in which these became not only specialists, but noted and successful men. They are too apt to believe that, to be successful, nothing is requisite but to be specialists. Therefore they are apt to rush into a specialty as soon as, or before, they graduate, neglect general medical knowledge, and miss their aim, both scientifically and pecuniarily, because they ignored the fact that their admired examples were medical men before they were specialists, and went, so to say, with a large capital, and all their mind, into a special business. It is true that the *progress of medicine depends on the continued efforts of specialists.* But those who have contributed most to the advancement of our science were men who did not select a special work before mastering the domain of universal medicine, but selected it on the foundation of a general thorough education and knowledge. The brief remarks of the president your committee consider very timely indeed. While they do not disparage special studies and specialties of practice, they contain a wholesome warning against the heedless neglect of general medicine. Special journals, finally, while—when thoroughly scientific—they will not command a large sale, are *not only valuable but necessary.*"—*Medical Record.*

On the Kind of Teeth Usually Associated with Cataract.—Mr. Jonathan Hutchinson exhibited a number of drawings, casts, etc., illustrative of the kind of teeth usually met with in zonular cataract. He remarked that although it has been well known that children suffering from cataract have usually also badly developed teeth, the malformation has been variously ascribed to congenital syphilis, rickets, or general defective development. He believed that imperfect teeth are, as a rule, met with only in connection with one form of the cataracts of childhood,—viz., "lamellar" or "zonular" cataract, in which only a thin layer of lens-fibers, at a greater or less distance from the nucleus, and completely surrounding it, is involved; and the defect is compatible with very fair vision, and is often not detected till the child begins to learn to read, or till adult life. It is almost invariably symmetrical, and in many cases quite stationary. It is unassociated with any special diathesis, and rarely met with in more than one member of a family. These facts suggest that it is due to some temporary disturbance in the nutrition of the lens, and this is supported by the fact that it has probably never been recognized at the time of birth, generally not till the child is a few years old. The defect met with in the teeth in these cases is wholly different from that met with in congenital syphilis, and consists chiefly in defective development of the enamel rather than in alteration of the form of the teeth. But it is often found in association with the characteristic malformation of hereditary syphilis, and this may have given rise to the confusion. The incisors, canines, and first molars are the teeth which suffer most, and, as a rule with but very few exceptions, the bicuspids escape entirely. The contrast between the clean, white, smooth enamel of the latter, and the jagged, discolored spinous surface of the first molar, is often very striking. The first molars form the test teeth for this condition, as the upper central incisors are for the syphilitic. It occurs equally in both jaws in these teeth, and they are sometimes alone affected. The *permanent* teeth alone exhibit changes which can be relied upon for diagnosis. The condition of the teeth, which was well shown by the drawings, is that the incisors and canines are pitted, dirty, and broken, and often presenting very sharp edges, sometimes almost spinous. In some cases a horizontal line crosses the crown of the incisors and canines at one level, the part of the tooth below being narrow from before backwards, sharp, and broken. Non-development of enamel and erosion of the exposed dentine appear to be the essential features. In the first molar it is usually the surface alone which is affected, the sides of the crown being often covered with good smooth enamel whilst its surface is denuded, brown and rugged.

Mr. Hutchinson next proceeded to state that the coincidence of these teeth with lamellar cataract was not invariable. Cases on record showed this form of cataract might exist without these teeth; whilst the occurrence of these teeth without cataract was common. Hence he concluded that there was no direct correlation between the nutrition of the lens and that of the permanent teeth to explain the coincidence. He next referred to Arlt's observation that there was usually a history of convulsions in early infancy in cases of lamellar cataract, and stated his belief that herein might be found the explanation of the dental condition. It appeared from inquiry that these defects of the teeth usually result from attacks of inflammation of the gums in early infancy; and that mercury holds the chief place in the causation of such stomatitis. Moreover, there is reason to believe that mercury is given in large and repeated doses in many cases of infantile convulsions, and probably enters largely into the composition of some of the most popular teething-powders. He suspected that the malformed teeth were evidence that the patient had taken mercury in infancy, when the enamel was undergoing calcification; and this is supported by the order in which the teeth suffer, which is that of their priority of development. Inquiries into cases of lamellar cataract lead to the belief that the connection between this form of cataract and fits is almost universal; whilst that between the cataract and the teeth is general, but with marked exceptions; but where they are found together there is usually a history of treatment of the fits by mercury.

Mr. Hutchinson next referred to the fact that the idea of the connection of lamellar cataract, infantile convulsions, and malformed teeth was not new, for Arlt had published observations on the connection of fits and cataract more than ten years ago, and Davidsen ten years ago discussed the condition of the teeth. The latter thought, however, that the dental defects were characteristically those of rickets. Professor Horner had furnished him with statistics of seventy-eight cases observed by himself; in these there was a history of convulsions in 76 per cent., deformity of the teeth in 85 per cent., asymmetry of the head in 35 per cent., imbecility in 2 per cent., and rachitic malformations of the extremities in 4 per cent. The 76 per cent. indicates only that convulsions were *known* to have occurred in this number, and excludes the doubtful cases. Dr. Horner believes that rickets is the cause of the malformation.

Mr. Hutchinson next stated that he did not think that the rule that the convulsions stand in the relation of cause to the cataract, and the mercury given for the convulsions as cause to the dental malformation, was invariable, as there were certain exceptions; in some cases the use of drugs being denied where malformation exists, and in others several members of the same family being affected with zonular cataract with no history of convulsions and without malformation of the teeth. The latter class of cases are probably of different nature, and, as regards the former, other causes of stomatitis may determine the malformation. As regards the connection with rickets, Mr. Hutchinson considered it entirely wanting in proof.

In conclusion, Mr. Hutchinson summed up his results as follows:—

1. That it is exceptional to meet with lamellar cataract excepting in association with an imperfect development of the enamel of the teeth, but that definite exceptions, in which the teeth are quite perfect, do occur.

2. That the kind of defect observed consists in the absence of the enamel, and is shown on the incisors, canines, and first molars of the *permanent* set, to the almost invariable exemption of the pre-molars. That for purposes of diagnosis the first molars are by far the most important, and may rank as the test teeth, since they not unfrequently show the defect when the others escape.

3. That it is highly probable that the defects in the development of the teeth are usually due to the influence of mercury exhibited in infancy, although it is quite possible that other influences, attended perhaps by inflammation of the gums, may occasionally produce similar results.

4. That teeth of the kind alluded to are met with very often in persons who are not the subjects of zonular cataract.

5. That it is very rare to find lamellar cataracts without history of convulsions in infancy.

6. That there is probably no direct connection between the occurrence of convulsions in infancy and the development of lamellar cataract.

7. That whilst there is every reason to believe that the defective teeth which are met with in connection with zonular cataract are the results of mercury, the evidence seems opposed to the belief that the lenticular opacity is also due to the influence of the drug. The great frequency of mercurial teeth without lamellar cataracts, and the not very infrequent occurrence of lamellar cataracts without mercurial teeth, are opposed to this view.

8. That the very frequent coincident occurrence of lamellar cataract with defective teeth is to be explained by reference to the frequency with which mercury is given for the treatment of convulsions in infancy.

9. That there is no reason whatever for supposing that lamellar cataracts have any connection with hereditary syphilis.

10. That whilst it is certainly true that lamellar cataracts are commonly met with in young persons who show general defects of development,—short stature, ill-shaped heads, defective intellect, dwarfed lower jaws, or other physiognomical peculiarities,—yet there is seldom any proof of the existence of rickets; whilst it is quite possible that the particulars mentioned may be due to the disturbance of the nervous system in infancy in connection with the convulsions.

11. It is very important to distinguish between mercurial teeth and syphilitic teeth; that the peculiarities presented by each usually render this easy; whilst, however, the two are, as might have been expected, not uncommonly met with together.—*Reports Pathological Society of London, in the British Journal of Dental Science.*

GUM-CUTTING.—Some months ago, among your "Notes and Queries" was a question about cutting gums. A week or two later, a correspondent (E. T. W.) gave a very decided answer as to the propriety and usefulness of the operation. For some time before the question was asked in the *Journal*, I had been making the same inquiry of physicians whom I met, and I was rather surprised to find among the younger practitioners so many who had never used the gum-lancet, and who could not imagine the case in which it would be necessary.

The let-alone system of treatment is good; in very many cases it is the best; but it is not always the best. The relief afforded by a free incision through the gum in some instances in which there was acute pain has, under my observation, been more marked than that afforded by any other operation that I ever saw. The tooth, it is true, in the very great majority of cases finds its way through without difficulty to the child. The first indication to the mother whose child has always been nursed, and never fed, is often the feeling of an incisor against her nipple. In some cases where a proper plan of feeding has been followed, there is as little indication of trouble during dentition. Occasionally when the child is nursed, more frequently when it is fed, and often when it is improperly fed, the little one apparently suffers pain in the mouth, in the head, and in the bowels, whenever a new tooth is about to make its appearance. In another class of badly-fed patients there is always loss of appetite at this time, with sleepless nights, nausea, and vomiting. In others, cough comes on which only exists then, and for which auscultation gives no explanation ; and the little patient's sufferings are augmented by " hive syrup," squills, and other nauseants which give no relief, and by " Mrs. Winslow's soothing syrup," and other narcotic drugs, which stupefy but do not cure. There is still another class consisting mainly of improperly-fed children, who have convulsions, sometimes slight it is true, and sometimes fatal. There is no disturbance of the nervous system so far as I know which may not exist in the teething child, and none which may not be aggravated by improper food. Indeed, the time of dentition is the time when by far the greatest number of deaths take place among children, whether the immediate cause be in the head, the chest, or the abdomen.

There are two common notions among maiden ladies, who are often the advisers of mothers younger than themselves ; these notions are the source of very great suffering to babies, and occasionally the cause of death. They are, that cutting the gum is very injurious, because "it may callus over afterwards and become so hard" that the tooth cannot get through so easily as if let alone ; and secondly, " that the child may bleed to death" after the operation.

To the first of these the reply is, that no union of the gum after it has been cut will ever be any firmer than the gum itself was before it was cut. Cutting the gum may be as great a relief to an obstruction as when an incision is made over a bullet, a piece of bone, a splinter of wood, or a fragment of needle beneath the skin, and the system is trying alone to help it to the surface. More than this, the tooth is not only below the mucous membrane of the gum, but it may be within the sac in which it was formed, and which the force of nature is trying to perforate. If this covering be once cut across, its union (if it ever unites again) will be less perfect than before, and the patient's sufferings will be relieved. Suppose the gum should heal after the incision, and the child's sufferings should recur ; that is not a good reason for withholding relief now. And if it should suffer again, it can be relieved a second time, and even a third time. I never saw the case in which, if the gum-lancet went well through, and was felt upon the surface of the tooth, there was any trouble with that particular tooth afterwards. It surely never could retract, and become deeper in the jaw than before.

The first effect of the incision is the relief of local pain by the oozing of blood. This is more particularly the case in those instances in which the gums are dry and hot, and there is no secretion from the mucous follicles nor from the salivary glands. An incision simply through the mucous membrane is followed by blood, and that by saliva in a very short time, giving great temporary relief; but if the lancet is felt to graze the tooth through the whole length of the incision, the relief is more than temporary; the immediate covering of the tooth never unites again, the growth of the tooth and the elasticity of the tissue preventing that process. If the offending tooth be a molar, a crucial incision is better than a longitudinal one. The relief is often so great from gum-cutting that I have seen children who were crying with agony, before the operation, look up in my face and laugh through their tears; and I have known a child to come to me, and show by unmistakable signs her remembrance of the benefit received on another occasion, by turning her head over upon my knees, and pointing to the swelling above a cuspid tooth.

The second effect of gum-cutting is the relief of obstinate diarrhœa, obstinate constipation, and of all apparent signs of diseased brain, such as vomiting, stupor, convulsions, enlarged and non-contracting pupil. This relief I have seen more than once during the past year.

The second notion with which non-professional persons are possessed is the hemorrhagic. I have no doubt that in my thirty years of professional life I have had quoted to me, on an average, more than one case a year of fatal hemorrhage from gum-cutting. But I never saw such a case, and I never spoke with a person who had seen one; it had always "been told to her" by some one else. I can imagine that it might be the possible result in one of the so-called "bleeders;" but a prick with any other instrument in any other part would in that case be likely to have the same result. The nearest approach to this condition that ever came under my observation was some ten or fifteen years ago, in the case of a young man of at least twenty-five years of age, who died of hemorrhage following the extraction of a tooth.

There is no operation, no medicine, which may not be followed by death. So sometimes neglect of medicine or neglect of an operation is followed by death. To offset any death resulting from gum-cutting (an accident which I never witnessed and never heard well authenticated), I could point to large numbers of infants whose comfort has been established, whose lives I believe to have been saved. There are many more whose comfort I believe to have been sacrificed, and whose lives I believe to have been destroyed, by the prejudice against the gum-lancet. —*C. E. Buckingham, M.D., in Boston Med. and Surg. Journal.*

THERAPEUTIC USE OF CALABAR BEAN IN TIC-DOULOUREUX.—Dr. W. Munro writes to the *British Medical Journal:* Believing that in tic-douloureux the blood-vessels of the part affected are in a state of contraction, I have made use of the bean in several cases with exceedingly satisfactory results. Very short notes of the cases are appended. I may say here that Cupar is a rather low-lying place, in which tic-douloureux of an intermittent form, which disappears on the person leaving the town, even for a time, is not uncommon. Fever and ague in those who have had it abroad is apt to return. There is, in fact, a slight malarious influence evidently present in the atmosphere.

Case 1.—October 16th, Mrs. D. had tic-douloureux on the left side of the head. I applied one of Streatfield's ophthalmic squares to the eye. In about five minutes she expressed herself as decidedly relieved. This was not a very severe case, which may account for only one square being sufficient.

Case 2.—November 6th, Mrs. X. had severe tic-douloureux, with intense photophobia, brought on by reflex irritation after several days' severe uterine pain, which had now passed away. I used one square, in the right eye. In ten minutes she was able to open her eyes and converse cheerfully. In half an hour I used another, relieving the pain entirely, only leaving a "slightly bruised feeling," which was almost entirely removed by another half. The pain did not return, and no more Calabar bean was required. The pupil was never contracted.

Case 3.—Miss J. K. had severe intermittent tic-douloureux, with anæmia. At present it was almost remittent. She had very severe pain all over the left side of the head, and some on the right side. The pain was intense over the left eyebrow. The pupils were much dilated. She was first seen on December 10th, at 11.15 A.M., between which time and 4.30 P.M. three squares and a half were used (from half to two at a time) in each eye. At 6.45 P.M., she had no pain. At 8.30 P.M., I found that she had had a very slight short pain about 7 P.M. Both pupils were still dilated. December 11th, pain returned at 3 A.M., and continued almost constantly until 1.30 P.M., when I used two drops of a solution of extract of Calabar bean (1 in 40) in the right eye (that being the side most affected). In fifteen minutes the pain was much relieved. At 3 P.M., I found her asleep, but on awaking she felt slight pain on both sides of the head. I used two drops in the left eye and one in the right. In ten minutes the pain was quite gone. At 9 P.M. she was sitting up, and felt quite well. From this time until December 26th, when I ceased attending, she could at any time stop the pain at once with the drops, which I found it convenient, however, to make of the strength of 1 in 32 afterwards. I treated her at the same time (from the 13th) with quinine and carbonate of iron, with decided benefit. I used the thermometer frequently in the armpit in this case, but observed no decided change of temperature attributable to the use of Calabar bean.

Case 4.—Miss T. had long-standing tic-douloureux, yielding to no treatment. It was only relieved by leaving Cupar for a time, and came back on her return. The pupils were generally much dilated, especially during an attack. I thought of using croton-chloral-hydrate in this case, but preferred the Calabar bean as being only local in action, as I think local remedies are always to be preferred for local diseases, when there is a choice. December 31st. When I called, found her suffering from intense pain over the eyebrows, mostly on the left side. I used two drops of a solution of 1 in 30 (partly lost) in the left eye, and one in the right. In about ten minutes, she said the pain was not quite so severe. I then used one drop more in each eye, with the effect of relieving still more, according to the patient's statement, the localized pain, but on my return half an hour or so afterwards, I found her suffering from severe pain in the left eye, the pupils being contracted. The patient, being very reticent, had not mentioned to me that tic-douloureux could be set up in the eye by even a drop of water getting into it, and even now said nothing to let me understand that the pain was that of tic-douloureux (which, unfortunately, she was too well able to distinguish from other pains). Seeing the rather strong contraction of the pupils, I used at once one-third of an atropine square to counteract the effect of the Calabar bean, thinking the pain was caused by the contraction. The atropine acted only too well, evidently being assisted in its action by the tic-douloureux, and the pain *immediately became more severe.* The dimness of vision common after the use of atropine remained in the case for three or four days, and frightened her, she being rather hysterical, so that she refused to submit to further treatment.

Thus, in this case, the only one which has not been perfectly satisfactory in its results, although the patient was not really benefited by the use of the Calabar bean, the pain was, in the first place, according to her own statement, removed from its primary seat; and, even although set up in the eye by the cold drops, it was evidently kept in check by the action of the bean until the latter was counteracted by that of the atropine. In such a case, outward application of the tincture (which I suggested, but the patient would not use it) or the use of strong Calabar bean, or physostigmatin squares, would be advisable.—*Medical and Surgical Reporter.*

NOTE ON SALICYLIC ACID.—This substance, long known as a rare and curious chemical derived from the vegetable kingdom, has lately been brought into prominent notice, chiefly in Germany, from its relation to those changes which are commonly known and best understood as fermentations, to which class or kind of changes so many diseases and pathological conditions are now pretty well known to belong.

The writer knows far too little of the subject and its relations to attempt an accurate or exhaustive paper upon it, and the object of this note is simply to call attention to it, that it may be read up in the current literature,—to give a brief outline of its bibliography, that reference may be made in regard to its history,—and to offer some thoughts in regard to its sphere in medicine.

Salicin is a glucoside or neutral vegetable principle discovered by Leroux in 1830, in the bark of some species of willow, Salix, whence its name. It was afterwards found in various species of poplar, and in other trees and plants. Salicin was chiefly investigated by Piria, who gave an elaborate account of its derivatives, and among these, of salicylic acid. Early in its history the acid was prepared by Löwig and Weidman from the flowers of Spiræa ulmaria; and later, a research by Prof. Procter, of Philadelphia, showed that our oil of wintergreen, Gaultheria procumbens, was really a salicylous ether; and from this source salicylic acid was obtained by Cahours. Gerhardt, Ettling, and others contributed to the researches by which the properties and reactions of salicylic acid were accurately determined and its composition fixed; but as yet it was but a chemical curiosity whose potential possibilities were quite unknown. It still belonged to that class of substances which had simply consumed a large amount of patient labor, and in relation to which the rigid utilitarian asked Michael Faraday, "What is the use of such things?" and received for reply the answer, "What is the use of a baby?"

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The acid is in minute broken acicular crystals, which give it the appearance of a granular powder, soft and smooth under the pestle or knife, but somewhat rough or resinous when rubbed between the fingers. This powder is odorless and nearly tasteless. It has, however, a sweetish and astringent after-taste with slight acridity in the fauces, but none in the mouth; and though tasteless, it leaves a disposition or inclination to expectorate, which continues for some time.

It is practically insoluble in cold water, but is very soluble in hot water; and the water of a hot solution retains when cold, in proportion to its coldness, from about one part in two hundred and fifty to one part in five hundred of the solution. The presence of various neutral salts in small proportion in the water renders it far more soluble. Up to this time phosphate of sodium seems to have been chiefly used in Germany to render it more soluble in water for medicinal purposes, and it is said that three parts of phosphate of sodium will render one part of the acid easily soluble in fifty parts of water. It is much more soluble in alcohol and ether than in water. It melts at about 125° C. = 257° F., and sublimes at about 200° C. = 392° F. In common with other similar acids it forms salts with the principal bases, but these seem thus far to be difficult to make, and their effects have not been investigated.

It is used for medical and surgical purposes either dry or in solution. When used dry it is sprinkled on wounds, ulcers, or dressings in the form of very fine powder, in very small quantities, either simply powdered, or mixed in various proportions with some diluent, such as starch. When used in simple solution, either for spraying surfaces or for washes or gargles, it is used in tepid solution of about one part to three hundred parts of water. Where stronger solutions are required for washes, gargles, or to moisten dressings, one part of the acid and three parts of phosphate of sodium to fifty parts of water have been used. When applied to wounds, it appears immediately in the urine.

Its alleged advantages over all other antiseptics are: First, that it is far more powerful and effective in similar quantities; and, secondly, that it is, in all quantities necessary for complete effectiveness, entirely devoid of irritant action upon the living tissues. It is not caustic nor corrosive in any quantity, and never produces inflammation. In large quantities it may be irritant and painful, but yet rarely surpasses a stimulant effect, while it appears to be quite neutral in the very small quantities which are yet thoroughly effective. Thirdly, it is said to reach and prevent processes of decomposition which are beyond the reach of all other antiseptics or antiferments. These processes are of two kinds, namely: vital, or those in which living organisms have an important part, such as that produced by yeast and many of those which occur in putrefaction; and chemical, or those which occur independent of vitality, as the production of volatile oils in mustard and bitter almonds, the effect of diastase, etc. Now, while carbolic acid and other antiferments are azymotic, or completely arrest or prevent fermentations of the first kind, they are powerless with the chemical processes. Salicylic acid is said to be more effective with the vital ferments, and equally effective with the chemical. Fourthly, in quantities said to be thoroughly effective, it is entirely odorless and tasteless and harmless, whilst it has no poisonous effect in any reasonable quantity.

It prevents or arrests the souring of worts, washes, and beers of the brewers, and prevents or arrests the putrefactive agencies which are so troublesome and destructive to the glue manufacturers; and these and similar trades have thus far seemed to be its principal consumers. Separate portions of fresh milk set aside to become sour, one to which 0.04 per cent. of salicylic acid was added soured thirty-six hours later than the other. Urine thus protected was on the third day still clear and free from ammoniacal odor.

Varying proportions of the acid added to accurately measured separate portions of sweet milk, and these carefully observed afterward until they sour,—or, by the use of meat-juice instead of milk, observed closely for signs of putrefaction,—would offer good indications of the quantities required to arrest these varieties of fermentation.

Professor Thiersch, of Leipsic, used it upon contused and incised wounds, and in operations, with excellent general results, destroying the fetid odor of cancerous surfaces and pyæmic ulcerations. To such uses this writer would add the suggestion that for washing out the cavities of the abdomen and chest after those operations which tend so strongly to septicæmia, solutions of salicylic acid would seem to offer very great advantages, should it prove to be as bland and unirritating as it is stated to be, and yet so effective.—*Edward R. Squibb, M.D., in The Pharmacist.*

THE TROPHIC ROOT OF THE FIFTH NERVE.—Meynert, in his account of the brain, describes a root of the trigeminus as proceeding from the anterior ganglion of the corpora quadrigemina, which is characterized by containing large vesicular cells. This he regards as the anterior sensory root of the fifth, though by other authors it is considered to belong to the fourth nerve. This root forms the semilunar fasciculus of fibers seen near the median line in all transverse sections of the pons. Merkel, who has recently examined the subject, has arrived at the same conclusion as Meynert in regard to its origin, recognizing the first traces of the root in question in the cells and fibers lying between the gelatinous tissue surrounding the aquæductus Sylvii and the corpora quadrigemina. The ganglion cells here found possess two axis-cylinder processes, one of which, situated on the central side of the cell, is very fine and delicate, whilst the other, proceeding from its peripheral side, is much coarser, thus supporting the view put forward by Merkel some time ago, that bipolar ganglion cells are intercalated in the course of a fine nerve-fiber for the purpose of strengthening it. After their origin, the fibers descend till they almost reach the conjoined oculo-motor and trochlearis center; from thence they ascend obliquely by the side of the root of the fourth, and at the line separating the corpora quadrigemina from the velum medullare anterius the trigeminal bends underneath the fourth, just before the emergence of the latter, and forms the fasciculus which presents a semilunar transverse section. Meynert and Merkel differ in regard to the function of this root, Meynert considering it to be a sensory root, and Merkel a trophic root. Merkel founds his opinion partly on pathological evidence, which indicates that the trophic disturbances in the eye after injury to the fifth may have a cerebral origin, and partly on physiological experiments. In rabbits the roots proceeding from the quadrigeminal origin of the fifth do not fuse with the sensory root of the fifth, but run separately along the median side of this root. In an experiment he made, whilst the sensory root of the fifth was destroyed, this portion was uninjured, and only very transitory trophic disturbance was the result.—*London Lancet.*

A NEW MEANS OF RESTORING SUSPENDED ANIMATION.—In the London *Medical Times and Gazette*, Dr. H. B. Clarke, of Massachusetts, speaks of a case wherein the patient was apparently restored from a state of suspended animation by the touch of a finger thrust into the aperture of the larynx.

A rather delicate girl of seven years of age, after a day or two of slight indisposition, was seized with convulsions while playing in the garden. She was at once taken into the house, and as soon as preparation could be made was placed in a warm bath. On my arrival, nearly an hour after the time of seizure, she was still somewhat convulsed, but immediately afterwards she sank, pallid, relaxed, and apparently dead. With the aid of an assistant who accompanied me, artificial respiration was at once undertaken, and continued for from five to ten minutes, without any apparent effect. When about to abandon the case as hopeless, it occurred to me that possibly the tongue had not been drawn forward sufficiently to secure the passage of air through the larnyx. In an attempt to ascertain the condition of the larnyx in this regard, I passed my finger along the side of the tongue until I got the end within the laryngeal opening, which I had no sooner done than a gasping inspiration was made, which soon developed into regular breathing.

There was some twitching of the eyelids and other convulsive motions after resuscitation; but, under the use of ether by inhalation, there was no further paroxysm at this time. Some two or three weeks later, however, another attack occurred. I was sent for; but not having been found, there was considerable delay before another medical man was called. Upon his arrival the child had been dead for more than an hour, and no attempt at resuscitation was made.

. . . Previously to this experience, I had seen a similar result from the touch of a finger within the opening of the larynx in the case of a woman apparently dead from chloroform. In that case I had only noted the fact as a coincidence. With the second experience, however, I was struck by the extraordinary effect of this touch when many other means to excite the reflex nervous functions had failed.

Since these experiences I have twice seen this method of exciting inspiration succeed, once in a case of suspended animation from convulsions depending on dentition; and again in a woman seventy years of age, who was partially asphyxiated by nitrous oxide gas administered by a dentist for an operation on the teeth.

Remarkable Case of Idiosyncrasy.—A patient, aged fifty, desired me to make him a new set of teeth in black rubber, saying that he could not wear anything else in his mouth. This was done, with the exception of a little pink in front. I fitted the pieces in myself, and left him fairly comfortable. About three or four days afterwards Mr. X—— called on me, complaining of great heat and fullness in the back of the mouth and throat, said his tongue was swollen, and that ever since the new teeth had been in there had been an incessant flow of saliva, and that he felt quite ill.

He attributed all these symptoms to mercury, telling me that he had experienced the same trouble with a former piece some years ago.

As I could hardly bring myself to believe it possible that so small an amount of coloring matter could produce all these effects, I felt his pulse and found it quick and hard, his mouth I found much inflamed, and the tongue, to use his own words, "too large for his mouth."

I requested him to discontinue wearing the new pieces, and wrote him the following as a wash:

℞ Tinct. myrrhæ, ʒiij;
Potassæ chlor., gr. x;
Aquæ colognæ, ℥j;
Aquæ, ad. ℥v;
Ft. lotio.

When I called on him a few days later he was quite well, all the trouble having passed away, and it was with some difficulty that he was persuaded to give them another trial; but having done so, all the bad effects returned in a few hours.

The set was then remade entirely in black rubber, and has never given a moment's pain since.—*Mr. Gurnell-Hammond, Reports Dental Students' Society, in the British Journal of Dental Science.*

HINTS AND QUERIES.

Will some one please tell me the best treatment for a pulp which is hypertrophied,—in the condition known as proud flesh?—and if there is any chance of saving it alive?—S. T.

What will remove the odor of chloride of lime from the fingers?—R. S.

Rub them with pipe-clay.

Reply to O. T. O. (who asks for information about flexible lined rubber plates).—I have used the *soft rubber* over the hard palate invented by N——, of Albion, New York; have also had quite an extended experience with the flexible lined rubber plates invented by a Central New York dentist (I forget his name); also a soft edge invented by Dr. J. A. Straight, of Albion, Orleans County, New York. With this edge a plate can be fitted to the mouth in a perfect manner, and it is by all means the best application of soft rubber to hard in existence. I can fit the flattest of mouths with a perfect piece of denture. I would refer O. T. O. to Dr. Straight.—H. H. B.

Hemorrhage after Extraction.—Dr. S. B. Chase is quoted in the "Periscope" of the Dental Cosmos, April, 1875, detailing an interesting case of hemorrhage after the extraction of a tooth. In such a case, if the socket had been thoroughly well packed with the scrapings of the soft inner side of sole leather, placing the same in cone shape, point down or point to apex of socket, and packing between the jaws so as to leave the incisors one-eighth of an inch apart, then bandaging the chin so as to hold the jaws together, staying the bandage at the mouth and forehead, and the patient kept in *perfect rest* for three days, he would have had less trouble. An important point is to keep the bandages tight and the patient in a partially recumbent position. Should the hemorrhage begin again, unpack and repack. I have never seen this treatment fail.—H. H. B.

A young man recently presented himself to me for the purpose of having a filling inserted. On examining the cavity, found it filled with cotton, which, the patient said, had been placed over a small drop of *mercury* by a neighboring dentist to kill the nerve. He stated that the pain following the introduction of the mercury was intense for about six hours, when it passed off, and he has had no return of it. On removing the cotton, I found the cavity dry and the tooth without soreness. Never having heard of mercury being used for such a purpose, I ask that those who have will tell what they know about it.—C. A. N.

Extracting Teeth during Pregnancy.—In the department of "Hints and Queries," Dental Cosmos, March, 1875, a writer over the signature of A. J. N. reports a case in regard to which I desire to make a remark or two. First. The experience of my tutor for thirty-five years and my own for twelve years, has taught me never to extract a tooth for a woman during pregnancy, for fear of bad results. In lieu I give sedatives to such patients, with topical treatment of aching teeth. Second. The removal of any comparatively good filling I esteem likewise wrong practice. In the above-mentioned case, if the tooth had to be extracted, he should have let well enough alone until after his patient had been confined.—H. H. B.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the Office of the Librarian of Congress at Washington.]

(Continued from page 285.)

But it is found that to some individuals the application of even the mildest appreciable current of electricity, particularly about the teeth or jaws, is excessively disagreeable; so much so, indeed, as to be not preferable to the great pain of excavating very sensitive dentine.

When we unfortunately meet with this untoward complication, we are compelled to resort to the old surgical idea of systemic medication for the obtunding of general sensibility, or to utilize the dental idea in the direction of some one of the accepted "anæsthetics."

For medication, I have obtained my best results from the employment either of alternate doses of syrup of lactucarium and solution of sulphate of morphia, or, perhaps preferable for routine administration, an alternation of two grains of assafœtida (in sugar pill form) with ten to twenty drops of solution of meconate of morphia (same strength as laudanum).

The syrup of lactucarium is a medicament which is viewed with very different degrees of favor by practitioners; but these opinions are probably due to the varied results which are obtained in its preparation.

The solution of sulphate of morphia, although one of the most generally employed of all opiates, is yet most decidedly contraindicated in certain idiosyncrasies, causing every variety of deviation from the desired effect, even to the production of nervousness, restlessness, irritability, headache, and wakefulness.

It is for these reasons that I have regarded as preferable the assafœtida and solution of meconate of morphia treatment.

Assafœtida, in form of sugar-coated pill, is, as a rule, not difficult or disagreeable to take,—nor is it followed by much subsequent unpleasant taste, eructation, or sensation, but is usually, on the contrary, productive of that agreeable systemic soothing which is so desirable a precursor to a dreaded and really very painful dental operation.

The solution of the meconate of morphia is a preparation which seems not only to procure for us the desired effect in ordinary administration, but to be capable of meeting, most happily, the idiosyncratic difficulties which are encountered in the use of the other preparations of opium.

I have administered this solution with most satisfactory results, not only in cases where the solution of sulphate of morphia provoked startling wakefulness and intense headaches, but also in cases where even laudanum was so irritating that a drop upon the skin would produce a blister.

My usual method of administration is, a teaspoonful, or more, of syrup of lactucarium an hour or two after supper on the evening previous to the proposed operation; followed by a teaspoonful of the solution of sulphate of morphia at bedtime.

This insures a good, refreshing night's rest.

Immediately after breakfast the next morning, another teaspoonful of solution of sulphate of morphia, and as early an hour for operating thereafter as is convenient to the patient; or, a two-grain assafœtida pill, at the time indicated, for the syrup of lactucarium, followed by ten, fifteen, or twenty drops of solution of meconate of morphia at bedtime (according to age of patient, as for laudanum); and after breakfast the next morning, repeat the dose of meconate of morphia, with prompt appointment afterward for operating.

In utilizing the dental idea of "anæsthesia," my own experience would lead me to recommend the comparatively safe sulphuric ether, which, except in cases that are exceedingly amenable to its influence, need not be carried to absolute insensibility; remembering always to secure, by means of cork or rubber wedge, an open mouth for operating while the patient is under the influence of the anæsthetic.

In cases where I have employed chloroform to aid in obtunding sensitive dentine, my rule has always been to administer a teaspoonful of whisky, or what is called "brandy," before using the anæsthetic, and then let the patient breathe gently a mixture of one part chloroform to three parts of absolute alcohol (ninety-five per cent.) until such general "glow" was induced as would permit of comfortable operating.

In this connection I must, however, say that for more than twenty years I was in almost daily use of ether, chloroform, or nitrous oxide, frequently administering them several times daily, and that the many thousands of administrations of these agents have only confirmed the conviction, which was early implanted in my mind, in relation to the danger incurred with every exhibition of chloroform. It was early in 1848 that my father gave the first warning of the *probable* danger attending the use of the then new anæsthetic,—an assurance of the correctness of his position was soon given in the "first death" from chloroform. But it is not alone *danger to life* which experience has taught us has occult connection with the induction of this strange condition of general "anæsthesia," but the many *peculiar sequelæ* which hosts of patients join in corroborative testimony regarding, teach us that while some of these invaluable boons to humanity are comparatively free from danger to life, *no agent which in a minute or two can produce total exemption from all pain during severe operations, and induce absolute insensibility to all ordinary surroundings, can be regarded as* PERFECTLY SAFE *even in the most experienced hands.*

Indeed, I may add that, in my opinion, the greatest safety which experience confers is that increasing sense of necessity for constant watchfulness which seems ever to be the close associate of a prudent, observing, intelligent use of anæsthetics.

For this reason I do not urge the employment of these agents in the obtunding of sensitive dentine; but, on the contrary, have labored to reduce the necessity for their use to the smallest possible number of cases in this painful line of operating; but even with these views, I must conclude this subject with the assertion that in no operation can greater amount of intense suffering be spared a patient by the use of general anæsthesia than in these very instances of dentine so *peculiarly* and exquisitely sensitive as to be *unamenable to every other known method of obtunding,* while its proper excavation is unendurable without some palliative.

DEEP-SEATED CARIES.

When the cavity of decay is of that depth which renders liable any irritation of the dental pulp during the course of preparation or filling, or as the result of the operation.

With the general conditions of such cavities of decay and their contents dental students are made familiar during the progress of their studies in the direction of operative dentistry, but from the present stand-point every condition, however well known, will have to be viewed with its pathological, instead of its purely manipulative, bearings.

The sharp and ragged edges may be easily broken down and smoothed into proper shape; but it must be constantly kept in mind that during the performance of this operation at any instant far more serious injury than benefit may be inflicted upon the patient.

The cavity is found full of soft, decomposing material, an aggregation of mingled food, saliva, mucus, and dentine, which, viewed as foreign, and deleterious to the welfare of the tooth, should, of course, be removed; but it must be remembered that this very mass is not *only* injurious, destructive, and irritating from its putrescence, but that it may be *eminently protective*, from frequent thermal irritation; that but for its presence and its non-conducting qualities every introduction into the mouth of fluid or food in the least unduly hot or cold, or even the passage of cold air, might cause uneasiness and possibly severe pain; therefore,—

In preparing cavities of this description, the contents should first be gently loosened, by means of a bent probe or other delicate instrument, carefully avoiding any possible pressure or wounding in directions where a knowledge of the anatomy of the pulp-chamber would indicate as liable a danger of too close proximity to that important organ.

The cavity should then be washed out by *gentle* syringing, with *cautiously directed* streams of *tepid* water; and when this seems sufficiently accomplished, *then* the cavity may be dried with any of the preferred absorbents, such as old muslin, bibulous paper, spongoid, etc.

These precautions should *always* be used in cases which present the least indications of belonging to the class of deep-seated caries.

The *habit* of so treating such cavities, as a matter of course, should be cultivated, for these are certainly the most critically *delicate* conditions in which teeth are brought to us.

When such a cavity exists in a tooth, that organ is truly in a most accurate balance between comfort, health, and long-continued usefulness, and discomfort, disease, and more or less frequent annoyance, with no guarantee for its duration from year to year.

Skillful, careful, prudent treatment will almost always insure a satisfactory result, while, on the contrary, a jet of *cold* water, or the simple act of attempting to dry out the cavity prior to the preliminaries which I have indicated, causing impinging of impacted material upon an almost exposed pulp, may give rise to the *first note of alarm* from that sensitive structure; a note which, in despite of all subsequent skill, *may* be the first of an uncontrollable series of deviations from normality which shall eventuate in death of the pulp with all its undesirable concomitants.

Washed and dried cavities of deep-seated caries may, prior to complete excavation, be considered as divided into *three classes:*

I. Those containing very soft, white, pulpy, decayed dentine.

In these cavities the external edges are almost universally soft, easily broken down, with frequent detachment of large portions of enamel-structure with slight expenditure of force; the character of the decayed material is *short-grained*, homogeneous, and of that quality which permits easy removal and ready ingress to dangerous proximity with the pulp.

This should, therefore, carefully be watched and guarded against during the progress of excavating, and the more so as but very little, if any, sensation or change of color of dentine announces the approach to the pulp-cavity.

II. Cavities containing decay of various grades of discoloration: yellowish, grayish, brown, and even black.

In these, the external edges are of varied strength, but all are reasonably strong; while the strongest make those admirable, unyielding boundaries to fillings which best satisfy alike patient and operator.

While caution should, even here, control every movement of the excavator, there is by no means that necessity for great care which has been urged in regard to cavities of the first class; for we have in these teeth reasonably good resisting structure, a reasonable amount of warning sensitiveness, and a marked change of color in dentine to aid our knowledge of the probable location of the finest extremities of pulp-horns.

III. Cavities which contain semi-decomposed dentine of horny consistency.

It is in the preparation of these that the most marked *peculiarity* of excavating exists, for we have here *long-grained* decay.

This characteristic of decayed dentine, due, of course, to the peculiar structure of the tissue, is one which requires, always, considerable manipulative skill in its management, while sometimes the most dextrous operators are chagrined at finding the disastrous consequences which follow one unfortunate cut.

Excavators should be especially keen in this work, and should be chisel-edged instead of axe-edged, that the tendency, in cutting from the point of starting, should be to run outward instead of inward.

It is not within my province to enter into the minutiæ of direction of excavating, but it seems none the less my duty to inculcate the general principle of cutting from the center toward the periphery, that the greatest possible security may be attained that no more substance than is intended shall be removed with each stroke of the excavator, and that the least possible danger may be incurred of inadvertently loosening large and deeply-seated portions of tissue, which, if allowed to remain perfectly undisturbed, might be of immense advantage.

(To be continued.)

DENTAL EDUCATION.

No. 3.

BY ROBERT ARTHUR, M.D.

My last paper was devoted to an attempt to draw an outline of a course of instruction in Dental Pathology. In all the dental schools the subject of therapeutics receives a certain amount of attention, and in some it is associated with the subject above named.

In the announcement of the Harvard Dental College the subject is referred to as follows:

"*Dental Therapeutics.*—The instruction from this chair embraces the application of the general principles of medicine to the specialty of dentistry, with a consideration of sensitive dentine, pulpitis, periodontitis, caries, alveolar abscess, gingivitis, necrosis, and other diseased conditions of the dental and contiguous tissues, with reference to their treatment, and the therapeutical agents used therefor."

This subject in the institution referred to is associated, under the charge of one teacher, with that of Dental Pathology.

In the curriculum of the Philadelphia Dental College this subject appears to be assigned to the chair of Chemistry, although it is not specially mentioned in the announcement of 1874–5. Provision is made for an elaborate course on Chemistry; the lectures on this subject, it is stated, will be:

"First, a general discussion of chemical physics applied to medicine. Second, The laws of chemical attraction, with the nomenclature and notation of that science. Third, Organic Chemistry. Throughout the whole course of Inorganic and Organic Chemistry, the subjects will be fully illustrated by experiments of the most complete character.

"Particular attention will be devoted to the uses and application of this science to dentistry, and to make the course specially adapted to the requirements of the dental practitioner."

In addition to this course of instruction in the science of Chemistry, it is further stated that "the subject of Dental Materia Medica will receive particular attention, and the student will be made familiar with the preparation and administration of remedial agencies, along with the practical chemical manipulations in testing the purity of drugs and the application of antidotes in cases of poisoning. Theoretical and practical instruction will be given in the manufacture of *nitrous oxide*, and opportunities will be afforded the student to aid in its preparation."

Under the title of Dental Pathology and Therapeutics, the announcement of the Pennsylvania College states that the lectures, beside the former subject to which I have already made reference, "will also include a careful examination of therapeutical agents and their general application, while their special uses in the medical and surgical treatment of diseases of the mouth, both idiopathic and symptomatic, will be fully illustrated. Special attention will be directed to the use of the various anæsthetic agents, chloroform, ether, and nitrous oxide."

In the announcement of the Ohio College, the subject is referred to under the heading of Dental Pathology and Therapeutics, as follows:

"The therapeutical instruction will be practicable; particular attention being paid to those remedies most used by the dental profession."

In the New Orleans Dental College one of the chairs is styled: "Institutes of Medicine and Dentistry and Special Therapeutics." The subjects embraced in this course of lectures are: "General Pathology, Special Pathology, General Principles of Therapeutics and Special Therapeutics."

In the Baltimore College of Dental Surgery there is a professorship of "Dental Science, Surgery, and Therapeutics." Materia Medica is associated with Chemistry in this institution.

In the New York Dental College, "Therapeutics, Surgical and Medical," is taught as applicable to oral surgery,—and Materia Medica in connection with Chemistry.

From the above statement, it appears that there is no uniform understanding among the dental schools as to what the term therapeutics means, or to what extent it should be taught.

Let us inquire, then, what is the meaning of the term, and to what extent the subject is one of interest to the student of dentistry.

Therapeutics, in a broad sense, treats "of remedies in general, and their application to the cure or alleviation of disease." (*Wood's Therapeutics.*)

Anatomy is made a part of the dental course, but it is not and cannot be limited to a description of the teeth and adjacent parts. An individual would have but vague ideas of the anatomy of these particular parts if he were not made acquainted with the apparatus of the circulation, with the nervous and absorbent systems, etc.; in fact, there is no element essential to the vitality of any part of the body, as I have been compelled repeatedly to state, not represented in and about the teeth. So with regard to physiology, it would be absurd to attempt to give any idea of the subject without going broadly into its consideration in the most general manner. The same may be said of the subject to which I am now referring. It is idle to attempt to give any adequate idea of therapeutics, even limited to its bearing upon dentistry, without taking it up as a department of medicine and treating it in its general aspects. I do not propose to go into any elaborate examination of this subject. My purpose is to endeavor to show its wide range and the extent to which it must be taught, if it is taken up at all. If instruction on the subject now referred to is to be limited to some directions with regard to the application, locally, of a small number of medicinal agents, it is scarcely just to dignify it with the name of therapeutics, or to give it any more than an incidental place in the course.

The question at once presents itself: What are remedies? They are not necessarily medicines, although all medicines may be remedies. "To constitute a remedy, it is not even necessary that it should be material. It may be a process or action, whether mental or physical, a state or condition, a change of circumstances, even a negative quality, or the absence or diminution of some positive agency. Thus we may also class with medicines, not only medicines, and the various substances which, though not strictly medicinal, are yet employed therapeutically, as water, electricity, etc., but also such influences as blood-letting, abstinence, exercise, rest, position, change of residence, cold, darkness, mental emotion, and many others that might be mentioned." (*Wood's Therapeutics.*)

But by far the greater number of remedies are medicines which are "substances capable of producing as an ordinary result and by their own inherent power changes in the healthy vital functions which render them available for curative purposes." (*Wood's Therapeutics.*)

"A medicine, in an enlarged sense, is any agent administered for the purpose of curing or allaying morbid action. The term is well understood to be appropriated to agents that are had recourse to therapeutically, or in other words, to the various articles which are received into the pharmacopœias and dispensatories." (*Dunglison.*)

In teaching general therapeutics, the operation of medicines, primary and secondary, through the circulation, by means of the nervous system and by local action; characteristic effects of medicines, influences modifying the effects of medicines, forms in which medicines are applied, parts to which medicines are applied, classification of remedies, are all subjects requiring clear explanation.

But after passing from this general consideration of the subject to special therapeutics, the field which presents itself is one of great interest to a dentist, and is a very large one. Here, too, we find that the more minute investigation of certain remedies must be preceded by further general considerations. Medicines, of which there are a great number, range themselves in accordance with the effects they produce into classes, and it becomes necessary that the nature of these medicines and their peculiar effects should be explained. A great many of these remedies deserve attention, even by a teacher of therapeutics in a dental college,—some of them very careful attention. And when we come to the special study of the agents which form these classes, we find many which are specially interesting and important in the practice of dentistry. The general characteristics of astringents involve many very important features,—their mode of operation, their effects upon the system, indications for and therapeutic applications of; external use of astringents, especially in the early or forming stage of inflammations, and in this view the application of cold as an astringent. The drugs employed as astringents are not very numerous; but some of them have been employed in the practice of dentistry for a long time.

Of the mineral astringents, it is necessary that the dental student should be made acquainted with alum, lead and some of its preparations; sulphates of iron, zinc, and copper; nitrate of silver, sulphuric acid, and lime.

Tonics form a large class of medicines. Many of the tonics, both vegetable and mineral, are agents of very great interest to the dental practitioner. The whole subject, indeed, of the use of tonics is of great importance in the practice of dentistry, as I could show if the limits of this paper would permit.

The subject of electricity as a therapeutical agent is one of special interest to the dental profession, and demands care and extended attention from a teacher of therapeutics. It may be supposed that the subject of electricity, in a general way, will receive attention from the teacher of chemistry; but he cannot, of course, be expected—as he has his hands full with his own special duties—to devote any time to the account of its therapeutical applications. The employment of this agent in odontalgia and neuralgia has, in some cases, been found effective; it certainly deserves more attention than it has ever received in the practice of dentistry. I observe that Professor Flagg refers to the successful employment of the electric cautery for the removal of extreme sensitiveness of the dentine. The employment, too, of electricity, in rousing up the failing vital energies when prostrated by the action of anæsthetic agents, renders it of further especial interest to every one who employs these agents. The apparatus required for its application for such purpose, and its action upon the nervous system, are subjects requiring much more than superficial treatment in a course of lectures on therapeutics.

The subject of anæsthetics is one requiring very careful and elaborate attention. It appears to be the settled conclusion of the dental profession that nitrous oxide gas is the best anæsthetic known at the present time. It may be that this is true. It is certain that it is employed in the most reckless manner by men who are entirely ignorant of its properties—men who manufacture it with little knowledge of conditions which may render it, instead of the most harmless of anæsthetic agents, one of injurious character. When the fact that fatal effects have resulted from its use in but one or two instances, although it has been administered in a vast number of cases, is considered, it would certainly appear to be comparatively harmless. But, although fatal results attending its use have been so rare, unpleasant and injurious effects have occurred. But no one who has observed the physical impression produced by this agent—the stertorous breathing (a dangerous symptom in the employment of chloroform) and the excessive congestion of the face—can feel quite easy in contemplating the near approach to the boundary between life and death which these symptoms appear to indicate. I have not had experience enough in its use to have come to any conclusion as to the possibility of avoiding this apparently dangerous condition, or to appreciate fully its importance; but such symptoms should be well understood, and the most careful instruction given with regard to them.

But this agent is not always available; there are many positions and circumstances in which resort must be had to other anæsthetics, of which ether and chloroform are those only now employed. It becomes necessary that a teacher of the subject under consideration should give these agents the most careful attention. An account of their properties, their action upon the system, a careful analysis of the fatal cases which have occurred, are certainly indispensable. What I have said in this connection is the merest intimation of what is demanded in the way of instruction to men entirely ignorant of the subject.

With regard to the general employment of anæsthetics, although somewhat aside from my present object, I cannot refrain from the expression of some astonishment that nitrous oxide has been ignored by the medical profession. When the anæsthetic properties of sulphuric ether were demonstrated by the dental profession, chloroform was proposed and employed as preferable. It has been extensively used in preference to ether, but fatal effects in a number of cases have forced its abandonment to a great extent, especially for the reason that the causes which led to fatal results in a number of these cases have never been clearly made out. The objections to ether are its comparative slowness of action, disagreeable odor and flavor, and other unpleasant characteristics. But none of these objections attach themselves to nitrous oxide. Its anæsthetic effects are much more rapid than those of either chloroform or ether, and it has been demonstrated that a patient may, without risk, be kept under its influence for an indefinite length of time. Why it is not employed in medical and surgical hospitals and clinics is one of those problems for which, like many others at the present day, it is difficult to find a solution. But, whatever may be the comparative value of these agents, it cannot be disputed that everything pertaining to them should be fully expounded by the professor of therapeutics in a dental college. I need scarcely say that this will require some knowledge of chemistry and an acquaintance with facts and statistics relating to this subject, the presentation of which will occupy no little of the time he has to devote to his important course.

The subject of escharotics and caustics is one of so much importance in a dental curriculum, that every agent of this nature should receive careful attention, and their effect upon the organism be explained. Arsenious acid, so extensively employed as it has been for nearly half a century in the practice of dentistry, requires full attention.

Depletion, too, is a subject of great importance. Local depletion is a remedy to which a dentist is compelled frequently to resort, and it is essential that he should know when he may employ it with advantage, and when it may be worse than useless. It is of course understood that materia medica is involved in therapeutics, and that a full and careful account must be given of the properties, as well as the action on the organization, of therapeutic agents. This alone, even if the teaching is confined to those remedies of especial importance to a practicing dentist, must necessarily consume a great part of the course of lectures.

But it is needless to go further in this detailed examination of the subject of therapeutics. Its extent—the extent to which it must be taught if attempted at all—is already fully apparent. I am aware that I have furnished no novel information to any well-educated dentist. But I desired, as I have done, to give some faint idea to those who are unacquainted with it, and to recall to those who are, of the extent of this subject; for the purpose of aiding in the further inquiry as to how such a subject as therapeutics can, under the present system of dental education, receive adequate attention. I will make this inquiry more critically in succeeding numbers of these papers.

PREPARATION OF TEETH AND CAVITIES FOR FILLING.

(Read before the Association of the Alumni of the Pennsylvania College of Dental Surgery.)

BY WILLIAM H. TRUEMAN, D.D.S.

We do not propose to treat this subject in the detailed and methodical manner of our text-books, but rather take the opportunity to make a few somewhat unconnected remarks upon the preparation of cavities and their surroundings. The subject has been so often and so well canvassed, it is hardly probable we will be able to find anything new, but there are still many questions of practice and of fact it may be well to go over once in awhile and examine in the light of a larger and riper experience.

The excavation of a cavity and preparation of its surroundings is by no means an unimportant part of our labor. The care and skill exercised here forms the foundation of the filling, and often measures its usefulness. We are apt to think it a simple operation because, from familiarity and constant repetition, we form our judgments and plan the work as we proceed almost intuitively, and lose sight, for the time being, of the many considerations which still guide and direct our action.

The first effort in preparing a cavity is the endeavor to see with the mind's eye the finished filling, to take in the extent of injury, the probable disturbing and dislodging agents the filling may have to contend with, and, with a clear idea of the anatomy of the tooth, to discover and use to the best advantage the most resistant part of the structure, while encroaching as little as possible upon its vital and sensitive tissues.

We have also to consider the patient's age and physique, the character and position of the teeth, whether the operation is intended to be temporary or permanent, and also the patient's habits as regards cleanliness.

In growing patients, our operation must be directed rather by the age of the teeth than the age of the patient, as there is no fixed relation between the two, either as to the teeth coming into position or their progressive development.

When children's teeth very early need our attention, they require the gentlest and most judicious treatment. They are often surrounded with unfavorable conditions which time may improve, and in such cases temporary operations seem to be called for. At this age, nature is more plastic, better able to bear and repair injuries, and the teeth more vascular and enjoying a more intimate connection with the nutrient system than in adult life. The bony structure has neither the density nor substance it afterwards acquires, while the pulp is quite large and easily irritated or exposed. These considerations teach us the importance of leaving all we can to nature, simply protecting the diseased spot by some easily-applied temporary operation. Such cavities on the masticating surfaces we can often arrange with very little excavating, by the use of oxychloride and amalgam; using the oxychloride much in the way we would in treating an exposed pulp, and covering it with amalgam as soon as it becomes hard. If care is used to secure firm edges and the cavity is kept dry till the filling is finished, it will last until both patient and tooth are prepared for more perfect work.

Sensitive dentine and nervousness—the latter a polite term, far better understood by the dentist than patient—are each a source of great annoyance. The rubber dam, the burring machine, the use of temporary fillings, a little tact, sharp, judiciously used instruments, and a little patience, are usually sufficient to master sensitive dentine; but chronic nervousness is a disease for which we have no cure and but little sympathy.

The excavation of proximal cavities upon the anterior teeth requires very delicate and discreet manipulation. When the adjoining teeth are in position we must first obtain room. The best way to do this is an open question. When the teeth are not too closely crowded and the cavity is in the usual position, this can often be done without seriously injuring the shape of the tooth by the use of the chisel and file. The use of these instruments is almost essential in a great majority of cases, so as to leave a free and permanent separation.

The necessity of this depends very much upon the care and attention patients bestow on their teeth. We can depend very little on the faithful promise of careless patients, and may expect the careful will sometimes become weary in well-doing. It is therefore good policy, while enjoining the importance of strict attention to cleanliness and the constant and thorough use of tooth-brush and dentifrice, to so arrange our operation as to present as far as possible self-cleansing surfaces.

Where the teeth are crowded we prefer to insert a rubber wedge to press them apart, allowing it to remain a few days. and then replace with cotton and sandarac pressed firmly between the teeth, and let them rest until the soreness caused by the rubber has subsided. By this plan we obtain ample space with but little discomfort, and the cotton pressing the gum away, gives us free access to the cervical wall, a weak point requiring our closest scrutiny. The various methods of rapid separating, by the aid of screw-jacks, mallets, and wedges, we thoroughly condemn; they may be tolerated in very exceptional cases, but, as a rule, they are as inefficient and useless as they are barbarous.

The anterior upper teeth afford the dentist an excellent opportunity to display his artistic skill, and he succeeds best whose work is least seen. Approximal cavities on these teeth, wherever possible, should be approached from the inside, with wide V-shaped separations.

These wide V-shaped separations from the palatine surface are permanent. The teeth touch only, if they touch at all, at the extreme labial angle, the strongest and most resistant point. There is no place for lodgment of food, and every part of the filling is accessible at any time for examination. The operation is entirely out of sight, and the natural form and appearance of the teeth but little changed. The cervical walls of these cavities, especially if they approach the neck of the tooth, must be examined with greatest care. They often approach very close to the margin of the enamel, where it chamfers off to overlap the cementum, and is very apt to splinter off, either during the operation or after it is finished, especially if there is a groove or undercut to retain the filling. If this is suspected, it is better to cut it away at once, and we may always distrust it unless a close examination proves it to be strong. The lower incisors, fortunately, require attention less frequently than the upper. On account of their size, shape, and position they are troublesome teeth to work upon. Quite slight cavities often approach too close to the pulp for our patient's comfort. All our work is done from the labial surface, and the V-shaped separation is reversed. This is a matter of but little importance, as the lower teeth are seldom in sight, and when seen are not brought so prominently into notice as the upper. They are usually more dense and resistant, and fillings on their approximal surface, being less exposed, will be retained with less depth of cavity than the upper. There is usually far more difficulty in obtaining space, while the mobility of the jaw and the presence of saliva often render these operations very trying. The automatic saliva-ejector and rubber dam are valuable if not indispensable assistants.

Another class of patience-exhausting cavities are those found on the labial surface, near the neck of the anterior and bicuspid teeth. Where they extend below the gum, it is usually best to partially excavate and fill, for a few days, with cotton and varnish, making the cotton press hard on the gum, so as to get it out of our way. It is seldom the rubber dam can be used in these cases; whenever it can it is of decided advantage.

We have generally to depend upon the cervical and upper wall to retain the filling, especially if the cavity is large; the shape of the teeth necessarily makes the other wall too slight to be of much service. This part of the tooth is usually quite sensitive, and the near presence of the pulp forbids the use of any powerful obtunding agent. The free local application of chloroform or ether, and sometimes aconite, will often give considerable relief.

Much diversity of opinion exists as to the best form of fillings for approximal cavities of the posterior teeth. As a rule, I think large double V-shaped spaces give the best results. Contour filling, if skillfully performed and well attended to by the patient, may, in some cases, answer a good purpose; but we are so apt to have recurrence of decay at the cervical wall, that, considering the labor involved and the risk that decay may go on unnoticed until irreparable injury is done, it is a question if it is not best, as a rule, to sacrifice a portion of the masticating surface and insert a filling not only less liable to injury, but in a position we can examine at any time. It has been suggested that where the enamel surface has been entirely removed, we should enlarge the cavity so as to remove the entire dentine surface, even if it be hard and sound. In some mouths, especially with careless patients, this dentine is apt to break down, but if it is properly smoothed and polished, this is the exception and not the rule. In all cases where the shape of the tooth is changed as a preparation for filling, too much care cannot be used in smoothing and polishing the surfaces, and in all cases these places should be frequently examined and repolished if there is the least sign of decay setting in.

We have said but little of the shape of cavities, nor yet have we attempted any detailed classification; in practice, this is regulated by the extent and position of decay. It is sufficient to say that every part should be as accessible as possible, and all sharp corners and angles avoided. Crown cavities, as a rule, should have parallel walls, and be as large at the orifice as the bottom. To accomplish this, in some cases, requires the sacrifice of a large portion of strong enamel. We frequently find crown cavities with a small opening through the enamel and a large cavity within. It is almost impossible to satisfactorily fill with gold under these overhanging edges, and when they are strong it is hardly consistent with conservative dentistry to sacrifice them. In a number of such cases I have used an improved quality of oxychloride, which admits of being mixed very stiff and remaining plastic long enough to thoroughly pack. With a little care, these undercuts can be effectually filled and the remaining cavity reduced to a more manageable shape.

When the oxychloride, especially the improved varieties, is kept perfectly dry, it becomes extremely hard; it takes a firm hold of the walls of the cavity; and where we can pack it in place and cover it with gold or amalgam before the moisture is allowed to reach it, I cannot see why it should not make a good operation. It moulds itself accurately to the walls of the cavity, more so than almost any other material we can use.

One case, a large post approximal cavity, in an inferior second bicuspid, lined with oxychloride, and afterwards filled with amalgam, has done three or four years' service, and when last seen was in excellent condition, and the color of the tooth was perfectly preserved. Is it not a better operation than cutting away so much of the tooth and replacing it with gold?

The extremely small portion of chloride used with the preparation at present in use can hardly cause any serious irritation, especially if the precaution of covering the bottom of a cavity with the oxide and creasote is observed. It rarely gives pain, even in deep cavities, and effectually prevents after-trouble from thermal changes.

This same idea can be used to decided advantage where pulps are nearly exposed, or where they would be if the cavity was thoroughly excavated. Making sure that the walls are free from diseased tissue, we may allow a little softened dentine to remain at the bottom, and treat it with all the care and precaution of capping the pulp. The propriety of leaving any diseased or softened dentine in a cavity has been frequently questioned. When we examine the usual course of decay, we find without exception it is always caused by external influence; whatever predisposing causes may exist in the tooth, they are powerless until excited by external influence. An imperfectly excavated cavity will not arrest decay, because it does not give firm and solid support to the filling; in other words, it does not hermetically seal the cavity; but in the operation in question, we first effectually seal the defective part of the cavity with a material that makes as secure and unyielding a foundation for the filling as the dentine itself, and under these circumstances we may reasonably expect the destructive action will cease. Of course we do not wish to be understood as advocating or excusing careless preparation,—we only refer to cases where we have the choice of two evils and choose the least.

The adaptation of the burring engine, and use of various forms of corundum disks, and improvements in material, form, and finish of cutting instruments, have done much to ease our labor in preparing for filling, but there is still room for improvement, especially in the burring tools, which rapidly lose their keen edge and must either be used at a disadvantage or repointed too often for convenience or economy. The burr drill would be far more efficient both for hand and engine use, by making the cuts form a sharp, prominent ridge entirely across the crown. As usually made, the cuts terminate or run out at this point, which soon wears smooth, and the instrument becomes almost useless, while the sides are still quite sharp. I have used many made as suggested, and find them a decided improvement.

The rapidly revolving tool of the burring engine has decided advantages in shaping many cavities. There is less danger of its slipping and wounding the gum when working at the necks of the teeth and in sensitive dentine; the tool being held solidly to its work, does not produce the painful jarring sensation which ordinary excavators do.

I am inclined to think a close study of the form and action of cutting tools used by mechanics in slide lathes and planing machines will very materially assist a dentist in his daily labor. It is only in machines like these, where the relation between the tool and the work is rigidly maintained, we have a chance to examine their action. The subject has been closely studied by practical men, and the results are readily accessible.

It will enable a dentist to better understand his instruments, and he will soon discover that they are not governed by whims and fancies, but by well-understood and inflexible laws. The ordinary hatchet excavator works well and smoothly when used as a chisel to cut the walls of a cavity, but when we apply it to the bottom, we attempt to use it as a scraper, for which its form and cutting edge are not suited, and the difference of action is at once apparent. The spoon-shaped excavator, so highly esteemed by some, has the elements of a universal excavator, from the facility with which the cutting edge can be kept in the line of work, and this also explains its usefulness in operating on sensitive dentine. It is at work in nearly all positions, while the straight excavator in some positions is chattering. To avoid frequent change of tools we may be compelled to use some at a disadvantage, but if we understand the principle upon which their action is based, the relation they should bear to the work required, and the best position of the instrument in relation to the surface acted upon, it will certainly enable us to use them more effectively.

There seems to be but little resemblance between the operation of boring a steam cylinder for an ocean steamer and drilling a retaining-point, yet the action of the tool in both cases is governed by the same general principles.

I have no doubt that the pain of excavating is often increased to a great extent by the faulty operation of our instruments, owing to imperfect adaptation or application. A rose head, as usually made, with a smooth point, keeping it out of cut, used in a small sensitive buccal cavity of a molar is very painful and of but little service, while a chisel drill sharpened from one side at an obtuse angle, will work rapidly with but little pain. A hoe excavator, properly shaped, can be used effectively on a surface where a hatchet would not be tolerated. The chisel is a very effective instrument, and owes its reputation in a great measure to the fact that its shape prevents its use in any other than a proper position. The force and resistance are opposed to each other in a direct line, and the instrument usually made is sufficiently rigid to prevent any chattering or vibration. The half-round chisel, so very efficient in opening into crown cavities or in heavy cutting through dentine in gaining access to a pulp, is copied from the nose tool, so essential to the mechanic for rough turning; and both tools owe their usefulness to the same cause.

REPORT OF THE COMMITTEE ON DENTAL ETIOLOGY TO THE AMERICAN DENTAL ASSOCIATION.

BY J. H. M'QUILLEN, M.D., D.D.S., CHAIRMAN.

PROFESSOR OF PHYSIOLOGY IN PHILADELPHIA DENTAL COLLEGE.

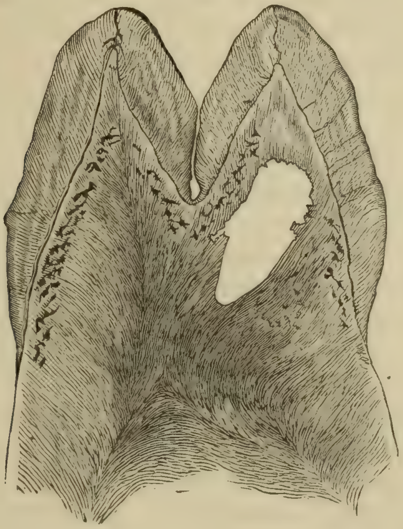
In presenting a report under this head, I would direct attention to the fact that, in viewing the pathological conditions presented by the dental organs, we must not forget that they are integral parts of the organism and governed by the same laws that control diseased action in other portions of the economy; in other words, that the causes of disease in the teeth as elsewhere are divisible into *predisposing* and *exciting causes.* The *predisposing* cause being in the teeth, defective structure of the enamel or dentine, due to hereditary transmission (as in the so-called syphilitic teeth, etc.), or the prevalence of certain constitutional diseases during the formative period, or defective nutrition in maturer years. The *exciting* causes are those external influences, such as the action of acids, variations of temperature, mechanical violence, etc., which, acting from without, develop the predisposition to disease.

As in other organs the predisposing cause of disease may remain dormant for years, or even an entire lifetime, if the exciting causes are not brought to bear with sufficient force upon them; so the same thing is true of the teeth. Classified as the teeth are with the skeleton by the anatomist, and in chemical composition more analogous to the bones than other tissues, it would be reasonable to infer that in diseased conditions of the osseous system the teeth would be very naturally affected under such circumstances. And this we find to be the case. In confirmation of this I propose to invite your attention briefly to these relations as manifested in the diseases known as Rachitis or Rickets, Osteoporosis, and Mollities Ossium.

Rachitis or rickets is a disease of early infancy, characterized by a deficiency of the inorganic and organic elements of the bone; the carbonates and phosphates of lime, and the *osteine*, are alike insufficient in quantity and defective in quality. In some instances it is an intra-uterine malady, but most frequently does not make itself manifest until the eighteenth or twentieth month of infancy. Both sexes are liable to it. Of the *causes* inducing this affection. Some cases seem to be hereditary, several members of a family being attacked; its origin has also been attributed to strumous, syphilitic, or scorbutic conditions of the system, and residence in low, damp, ill-ventilated places; the most prolific and unquestionable cause, however, is the use of unwholesome food or imperfect alimentation, inducing an impoverished state of the blood and defective nutrition. The affection may be confined to certain bones or extend to the entire skeleton. It is attended by excessive softening of the osseous structure, so that it yields to the slightest pressure, and the bones can be bent and twisted in various directions, often occasioning serious and irremediable deformity.

The teeth of patients who in early life have been affected with rickets are generally found defective in structure; the enamel generally presents a roughened and pitted appearance. On making a microscopical section of such teeth (which I have frequently done, and now have an opportunity of showing you one of the specimens under the microscope on the table), fissures will be observed in the enamel reaching almost to the dentine, whilst the dentine in immediate proximity to the enamel presents that defect of structure known as the inter-globular spaces. So prevalent is this latter condition, that in every tooth I have examined under the microscope from a rickety patient, they have been quite numerous. In a communication entitled "*Microscopical Fissures in the Masticating Surfaces of Molars and Bicuspids,*" published in the Dental Cosmos, vol. xiii. page 300, 1871, and subsequently republished in the *Monthly Microscopical Journal of London*, vol. vi. page 182, 1871, I directed attention to the fact that the minute openings or fissures found in the grinding, proximal, buccal, palatine, and lingual surfaces of molars and bicuspids frequently lead to cavities of some size. In confirmation of this I gave a description of a microscopical preparation which my friend Dr. R. W. Varney, of New York, had placed in my hands; of which I present the following extract from the article named:

"In the accompanying illustration (of a longitudinal section of an inferior pre-molar, as seen under an 8-10 objective and No. 1 eye-piece, magnifying sixty diameters), it will be observed that a minute fissure, invisible to the naked eye in the section, extends from the bottom of the sulcus on the grinding surface of the tooth, through the enamel, almost to the dentine, and enlarging at the lower part into an oval cavity. This is entirely the result of defective formation, the enamel prisms having failed to coalesce at that point, and thus a condition is presented favorable to the retention of fluids and semi-solids, which undergoing decomposition would speedily destroy the thin septum of enamel covering the dentine. In the latter tissue, closely contiguous to the enamel, a number of black spaces (the *inter-globular spaces*) will be seen. Here again is located defective structure, and a prolific predisposing cause of decay." "As evidence of the practical bearings of these investigations, it may be well to direct attention to the fact that the existence of these spaces in teeth which have completed their growth must be regarded as an *abnormal condition*, predisposing such teeth to decay, and that when either by mechanical action, as by a fall or blow, or by the penetration of external caries, such spaces are reached, the *disease here would run riot;* hence the importance of care on the part of patients and operators to have the most minute cavities filled, for though reached only through a microscopical opening, the result would be the same, while if protected from the action of external influences, or the *exciting cause of decay*, this predisposition might remain dormant for a lifetime, as is sometimes the case with other diseases."



Osteoporosis, in contradistinction to rickets, is an affection of the bones produced by dilatation of the Haversian canals, lacunæ, and canaliculi, and sometimes attended with softening of the tissue of the bone; whilst in rickets there is a deficiency of the mineral constituents of the bone and of the osteine. According to Rokitansky,* "This state may result from excessive development of the medulla of the bone, or of the tissues which occupy its canals and cells; while, at the same time, the actual quantity of bony substance remains unaltered. By a rarefication of its tissue of this kind the bone becomes increased in volume—expanded. The walls of the enlarging cavities become thinner and thinner, till at length apertures are formed in the interior of the bone, as well as in its outermost lamella, and the cavities communicate with one another. The expanded bone is soft, coarsely porous, and spongy; and more or less so in proportion to the degree of the disease; it yields to the pressure of the finger, and may be easily cut with a knife." The affection is most frequently observed in the bones of the skull, and may occur at any period of life, but is most frequent in childhood and old age. Among the recognized causes of osteoporosis are syphilis, scrofula, and rheumatism. I have had only one opportunity of making a microscopical examination of the bones and teeth in a case of osteoporosis. My friend Prof. Wm. Pepper brought to me a phalange of the finger of a boy, aged fourteen, a native of England, who died February 8th, 1868, after a painful illness. His face, body, and limbs had become very much enlarged and exceedingly painful prior to death. The true nature of the affection was not recognized until after his decease. After making a microscopical examination of the bone, I requested Prof. Pepper to supply me with one of the teeth, stating at the same time that I had reason to believe that the *inter-globular spaces* would be found quite abundant in the dentine. Having complied with my request by giving me a canine tooth, I found on making a section of it confirmation of the opinion I had expressed: the inter-globular spaces being scattered throughout the coronal dentine. Whether this would be found to prevail generally in the teeth of persons affected with this disease remains to be determined by subsequent investigations. It is not only an interesting but also an important point to determine, as it has a practical bearing upon the durability of the teeth, as some cases of osteoporosis are curable; it being succeeded by induration of the affected structure.

Mollities ossium or *osteo-malacia* is quite a different affection from either of these named, and attacks persons who have reached adult or advanced life. It is a rare but most destructive and dangerous disease of the bones, characterized by softening of the osseous tissue, dependent upon the gradual removal of the earthy constituents and the deposition of a reddish sero-albuminous, oily, or greasy substance. According to the authority already quoted,† "The bones diminish in size, and their texture is rarefied and atrophied; they become saturated with fat, and reduced to their cartilaginous element. In this condition their corpuscles are empty, and, when viewed by transmitted light, diaphanous; there are no canaliculi (Kalk-Kanälchen), and the lamellar structure is lost. The bone at the same time undergoes a striking change in chemical composition, the extract produced by boiling being not only different from chondrin, but also from the animal matter of bone."

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* Rokitansky's Pathological Anatomy, vol. iii. page 138. Philadelphia, Blanchard & Lea, 1855.

† Ibid., page 142.

The cause of this complaint seems to be involved in obscurity; in some cases it appears to be connected with a rheumatic tendency. It is more frequent in the female than in the male sex, and sometimes makes its appearance after child-bed. The affection may be confined to certain bones, or extend to the entire skeleton, as in the case of Madame Supoit, whose bones had become so completely softened that her limbs could be placed in almost any position. The lower extremities, for instance, could be bent so that the toes touched the back part of the head, while her arms could be thrown into equally distorted positions. She had lost all control over them, and was unable to move any part of the body, with the exception of the head and left arm. The disease frequently begins during pregnancy, or within a short time after parturition. It is said to be in some cases hereditary, presenting itself in three successive generations, but not prior to puberty. Of all the affections which we have considered, this one is the most interesting to us on account of the fact that the teeth are coincidently and seriously affected; thus it is not an unusual thing to find young women whose teeth prior to marriage were remarkable for their beauty and apparent perfection of the enamel and dentine, and which under the excavator and drill, when demanding attention, had been found hard and exceedingly difficult to cut with a keen instrument; after bearing one or more children their teeth undergo the most remarkable change, decay making its appearance in various directions, and the tissues cutting under the instrument with facility and as if composed of gelatin; and the decay not unfrequently progresses with such rapidity that one or more teeth are lost after each pregnancy, thus confirming the old adage, "For every child a tooth is lost." Are we not justified in attributing the softening of the bones in osteo-malacia and the remarkable softening of the teeth to the fact that during the period of pregnancy the demands of the fœtus in utero for the calcareous constituents in the food taken by the mother to build up the osseous structure are so imperative and exacting, that the mother is robbed of those constituents so essential to repair the interstitial changes taking place in her bones and teeth? And is it not also reasonable to infer in the cases that come under our observation where the teeth are so remarkably affected or changed during the period of pregnancy, that the osseous structure has suffered at the same time, but not in a sufficient degree to attract the attention of the general practitioner? I have never had an opportunity of making a microscopical examination of the teeth of a person affected by mollities ossium, but believe that it offers an interesting field for investigation.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 315.)

Prof. James Truman, of Philadelphia, then read a paper on "Dental Education," from which we make the following extracts:

The question that claims our attention this evening has been the theme of writers of high and low degree, until it has become the shuttlecock of theorists and the aversion of practical minds. It is, however, a question that needs free and untrammeled discussion more than any other subject connected with professional progress. Lying, as it does, at the base of all advancement, it must be regarded as the corner-stone of the building, and cannot be set aside as of transitory importance. It is the question, of all others, vital to the growth, the healthy growth, of our calling. If we recognize the necessity of a careful analyzation of the subject, a thorough and exhaustive examination of "means to ends," the work becomes, if not a pleasure, at least a duty, to thoughtful and appreciative minds in the profession.

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Is there anything for us as workers to do in this the last quarter of the closing century?

Before entering into consideration of this, it is necessary to view the position of affairs as at present existing. We are supposed to number to-day from ten to thirteen thousand operators of all grades; a large army when we consider the comparatively limited period of its development. Of this number some two thousand have received the degree from colleges, and a still fewer number can be regarded as having passed through the studies assigned by those institutions. The result is that from eight to eleven thousand persons are engaged in the practice of the profession who have not the degree, and of whose general intelligence we have no means of knowing. It is very safe to assume that a very large proportion are men whose attainments do not extend beyond the mere practical routine of mechanical operation, and a very large number are by no means experts in these directions. But whether we regard their attainments as of a very high order or the reverse, it must be conceded that this mass of professional, unorganized life is seriously detrimental to healthy growth.

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The question then becomes of serious import: What are we to do with this outlying mass, and how are we to meet its encroaches? We may answer in a general way, educate. This is an unmeaning term as thus applied. The task must ever be a hopeless one. Some progress may be made, but it can only be by slow approaches. Generations must come and go before we can hope to occupy the present favorable position of the medical profession. Denunciation has been freely used, and we all know with what results. Ostracism has been tried with as little avail. We have swung the gates to, and refused intercourse, but the stream has swept down our walls and found new openings through which to spread its festering influence. It has penetrated everywhere. Associations dread its influence. The journals are infected with it, and our colleges are made to suffer by it; and still the stream flows on, ever widening its destructive career. It must be apparent that other influences must be used to bar its further advance, or else wide-spread ruin will blast the fair garden we have nourished these many years, and over the gates will be written, "Weighed in the balance and found wanting." It must be evident that no body of men are to blame for this condition of affairs, nor can any one body change it. Any marked improvement can only be accomplished by slow, and, it may be, painful efforts. The most powerful lever will probably be found in the selfish qualities of our common nature. We must enlist the interest of these men on the side of education. We must make advancement worthy of even their efforts, by stimulating self-love. In a word, we must conquer by opening our doors wider instead of contracting them. It is not the purpose of this paper to define the ways and means to accomplish this. It will require the best thought of a multitude of minds to devise plans to effect a rapid change. It may be said that the growing intelligence of the general public will eventually cure the evil. Experience does not confirm this hope. The evil grows in magnitude daily. It seems to me the means for eradication must be divided between two measures apparently antagonistic in their effects and character, but yet capable of being powerful agents in producing a change. We may conciliate by opening the doors freely to membership in district associations. From these form State associations, strictly upon the representative principle, and from these a national organization should be effected of the same character. Above and beyond these should be formed an independent organization of strictly scientific character. Into this latter none should be allowed to enter but those who had given evidence of superior ability. This chain of associations would be a powerful moral incentive to enlarged self-culture. This would increase self-respect, and self-respect precedes all efforts to advance. From these associations should issue plans for legal interference. In our legal enactments the necessity of moderation should be constantly borne in mind. Allow time for moderate cultivation, and, at the expiration of the allotted period, fix the examinations at a standard low enough to take in the largest proportion of operators. All who cannot meet these requirements should be prohibited from practice. By these two means we may hope to eradicate the evil more effectually than by any let-alone process. We have groped our way blindly in this matter, and in the attempt to force laws in advance of preparation, have perhaps been doing more harm than good. The effect has certainly been to foment antagonisms that will be difficult to overcome. If we would accomplish our aim, the work must be philosophically considered and systematically arranged.

When we take into consideration this substratum of antagonistic elements, we must cease to marvel that our standard of education has not been raised. The wonder grows that, under the circumstances, anything worthy of commendation has been accomplished. It is impossible to expect any marked advance in collegiate instruction until this dead weight is gradually removed. Any attempt to force a higher standard will fail. Colleges as well as periodicals represent the profession. The first aim to keep in advance of the most ardent workers; the latter most truly represent the profession at its dead level. Whilst every friend of education would wish this were otherwise, we must take things as they are, and endeavor to solve the problem without forcing results. The curriculum of the colleges should be extended, says one. The time is too short, says another. There is too much time given to the theoretical and too little to the practical, repeats a third. And thus in doleful iteration the complaints resound through the land. Those engaged in the work of teaching feel that there is a limited amount of truth in all the criticisms made, but they feel and know that they are constantly stemming a tide which, unaided, they cannot hope to conquer. When the profession does its work by giving the colleges the support of a cultivated body of men, they will be braced for an advance, that, to prefigure now, would seem Utopian.

This brings up the question, Are our leading dental schools performing the work committed to them satisfactorily? I would answer, yes. The criticisms so freely made are based on a want of correct information, prejudice, or the before-mentioned ignorant opposition, devoid of reason. Those who were connected with colleges twenty years ago are hardly good judges of their present condition, and those who have never entered at all except it be for a few hours' visit, are incompetent judges. There has been a constant advance, until everything is taught with a degree of thoroughness not excelled by the medical schools. The time was when it was deemed sufficient for a student to be taught special anatomy and special physiology; in other words, their studies were confined principally to those subjects that bore a close relation to dentistry; but that condition of things ceased to exist years ago. The occupants of these chairs must now teach the subjects in their entirety. This applies to all the other branches taught. The true college work of to-day means hourly and daily labor, from the rising of the sun to far beyond the setting, and that almost continuously. It means an amount of self-sacrifice but little understood and still less appreciated. That it has been effectual, it is only necessary to look over the field of labor at home and abroad, and count the honored names who have made dentistry respected by the evidences given of a higher culture. The defects in the mode of teaching apply with equal force to medical schools. If it be a farce for a dentist to acquire his professional education in two years,—and it is not denied,—the absurdity is trebly increased when the same time is given to medicine with all its complications. The defects in both proceed from causes far beyond the control of faculties and boards of trustees, and cannot be removed by any sudden revolution. As they have been the creation of a necessity, the same great demand will cause their abrogation.

This brings me to the consideration of the question, Will a union with medical schools be advantageous? The subject is one difficult to treat correctly, from the fact that experience in this controversy has been acquired by either party from one-sided observations, and the results are not yet sufficient to shape opinion. Our profession has been built from very crude material, entirely outside of medical aid or sympathy. In the past we never claimed nor demanded admission as a specialty of medicine, nor do I perceive any force in the claim at the present time. We have a certain work to do. A large portion of this is entirely beyond the comprehension or taste of the medical practitioner, and it is asking very much of human nature to expect him to sympathize with it. The true position, in my judgment, for the dental profession is one of dignified independence; compelling recognition by ability to prove ourselves worthy of it. We have abundantly proved that dental colleges, working independently, are capable of giving most satisfactory results. We are not yet sure that union with medical schools will accomplish as much. As the experiment is being faithfully tried, it may be well to let time solve the problem, satisfied that that which stands the test will eventually be adopted. But one thing we may accept as a fact, that medical teaching is not the sole and proper basis for dental practice. Important as it is, it will aid very little to a practical comprehension of our profession. The opinion so generally held that this training is all-sufficient for dental practice, is a very erroneous one, and has been a cause of serious trouble in dental teaching. The most thorough medical education is far inferior in value to a five years' dental practice. I wish to be understood to mean that an individual graduating on five years' practice, after one session, will, in the majority of cases, prove worthy of entire confidence as an operator. This much cannot be said of the other. To make a perfect whole, the two should be combined, but this should be thoroughly done. Any dependence on one or the other to accomplish perfect results, will most surely fail.

The complaint has been made that our literature is not what it should be, and that our periodicals are far below a correct standard. If this be true, the fault lies mainly with the profession. The journals represent its thought, though by no means always the best thought. It is lamentably true that there is but a limited amount of that talent existing that drives the possessor to dredge for facts and to analyze them for the benefit of others. This kind of work superimposes an amount of self-abnegation not often found in this country, but common in the older portions of civilization. We are best satisfied with looking up authorities, and leaning on these rather than making our own, through independent observations. As long as this is the case, our literature will be inferior and our opinions be held of little worth by those who regard a single scientific fact worth a volume of theory. This state of things must be changed, or we must submit to have our reputation lowered in the estimation of an exacting scientific world.

England and Germany to-day are steadily advancing in dental practice and instruction. Institutions for teaching it properly have been, and are being, organized in both countries. Our too superficial mode of treating important subjects must be abandoned, if we would compete with the fine culture of England, or the persistent searching for truth so characteristic of the German. Our honors must not trail in the mire of satisfied ignorance, nor need we be distanced in the race of intelligence while surrounded with so many able to accomplish great results.

Let us then, if we may not agree on means, at least harmonize on the general fact, that that which American dentistry most needs to-day is to throw off the lethargy of the past, and to arise, put on the garment of a higher faith and loftier aspiration, that ignorance be dispelled, and the profession be made worthy the respect of the nations.

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Dr. Thomas H. Chandler then read a paper on the same subject, viz., "Dental Education." We give the following portions:

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A bad omen for good results of our aims is the multiplication of dental schools, or colleges, as they are ambitiously termed, and the consequent division of the energies of our profession among a multitude of feeble plants, which, applied properly, would serve to nourish a few good and noble trees. A tendency of this division, and of the consequent competition for support, is the lowering of the standard of education, flooding the land with half-educated men, and a depreciation of the value of the diploma which attests their acquirements. Such men are soon found out by the too credulous public, and they, too, having learned that the diploma means nothing, begin to doubt if there is any good even in Nazareth. To hint at the evil is to suggest its remedy, and nothing more need be said in this direction.

"There is another evil under the sun" in connection with dental schools. Among the requisites for graduation of all but one or two, is a clause which says that three or five years' practice shall be considered as equivalent for one term. Nothing is said or hinted of *reputable* practice, and the student has only to bring a certificate from his minister or deacon, or the "selectman" of his village, to the effect that he has practiced to his knowledge so many years, and the thing is done. One term is struck off, and in the four months of another, our practitioner, "after passing the requisite examination," is entitled to receive his diploma, and go out conquering and to conquer. How much of an examination can such a student pass? How thoroughly will four months even of the closest study indoctrinate him into all the mysteries of anatomy, physiology, chemistry, and surgery, to say nothing of the special dental branches which are to make his work in life? What wonder that the medical man, seeing this, laughs at our claim to be his long-lost brother? And then in the dental branches, where skill of hand and accuracy of eye go hand in hand, where experience is needed to mature the judgment, and iteration and reiteration of the manipulative act is necessary to make it habitual; what can four or even eight months do towards making the perfect dentist? Time is an element which seems to have been left out of our calculations, and yet it is the most important one of all. Take a winter afternoon of say at the most three short hours, crowd all that can be done into it in the way of filling teeth, and multiply this by one hundred, the number of afternoons in one term, or by two hundred for two terms, and how much of a dentist is the result? This is putting the case in its best form as regards operating. It might be possible for an ambitious student to put in one hundred fillings in one, or two hundred in two terms, but the possibility averages far ahead of the reality. Now, in the mechanical department, where the working in the various kinds of bases is to be learned, and where one operation extends necessarily over several days, the average of cases carried to completion must be very far lower. One a week would be a high estimate even for the most studious, and the greatest possible maximum could not be more than twenty cases for a term This is all to be done, it must be remembered, in connection, and carried along with the more strictly medical branches before spoken of. The point I wish to make is "the utter impossibility in four months of imparting a complete education; the very doubtful possibility of doing it in eight months; and the necessity of at least three years' good and thorough work to enable our results to equal our promises."

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A dentist's value to his patient and the public consists in what he can do rather than in what he can tell; in his skill of hand rather than the amount of his book-knowledge. He may be able to discourse most learnedly and well upon the methods and appliances of his art, but, unless his eye has the accuracy and his hand the power to use and apply them, his knowledge is of little use, and he is no dentist. Therefore I ask for more time for the practice of his work in our schools. What is an education good for which does not enable a man to do his life-work the better for its possession? I make no question of the value of book-knowledge, nor do I begrudge the time spent in acquiring it. The more a man knows, the better and quicker he can learn to do. I am an advocate of the highest culture in every direction, and wish our practitioners of the future, the men whom our schools are to send out to the world as representative dentists, to be men of a spherical culture, rounded off by study as well as practice of every kind necessary to form the perfect gentleman as well as the perfect dentist. For I claim he is not the one unless he is also the other. Hence, I demand that more *time* be given to the curriculum of all our dental schools. Boys come to us to be made *dentists*, to acquire manipulative skill and accuracy of working about the mouth and its organs. Then let us make them *dentists*,—not anatomists, or physiologists, or chemists, but *dentists*. Let this be our chief aim, and the others be subsidiary. If we cannot do all, then omit all but this. But we can do all with time, not without it. It is folly to attempt anything like completeness in an education which is begun and ended in four or even eight months. In this time a student can hardly "get the hang of the school-house;" for remember that the eight months, as we have it, is not a continuous time, but is broken into two by a long interval of eight months, sufficient for a student to forget entirely all that he has learned in the first four. All who know anything of teaching, know the facility which young people have for forgetting. It is only the iteration and reiteration, going over and over again the same ground, which serves to fix subjects of study in the mind of youth. Any let-up, till this is done, and the whole matter is often as completely lost as though it had never been heard of. No art, however simple, can be learned without such iteration, the frequent going over the same ground, any more than the arts of writing or swimming, easy as they appear to him who has learned. To acquire either took time, and that which now appears instinctive, done without an effort or a thought, was the subject of much labor, many struggles, and perhaps many tears. And so with our art. Who is there the most skilled and experienced among us who is not learning every day; to whom every hour of his practice does not offer a new difficulty or a new suggestion? And shall we ask more of the tyro than we can perform ourselves? Geniuses are scarce, and of those who enter our schools, scarce one in twenty can be said to have a calling to dentistry. To the other nineteen, then, everything is to be instilled by slow dropping, like the hole made by the dripping water—*non vi sed sæpe cadendo*—not with a rush, but by frequent falling. Therefore, I say, three continuous years should be demanded of the dental student, and of these a full half should be devoted to the special studies of his calling, viz., operative and mechanical dentistry. "Do this, but do not leave the other undone." Give us dentistry first and chiefly, and then round off with any or all other studies to complete the culture.

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The education which at the time of the founding of our first dental school was ample, has been outgrown, and to attempt to feed us now with the viands of that day is to leave us hungry. Our profession and the public demand more, and more they will have, and woe to the man or the school which stands in the way. He and it must succumb. The demands of the profession upon the schools are daily seen in our magazines and in the transactions of the dental societies throughout the land. The cry is the same: "We are a branch of the medical profession, and should be recognized as such." If we are, we should make our education up to the medical standard, in its special branches, and our schools to a level with the best medical schools. When we do this we may be recognized as fellow-doctors; until we do we can never hope to be. To those who have such an ambition, this should be an incentive to labor in this direction; to those who have it not, but who desire the elevation of our profession for its own sake, let me say that by no other means can they reach this end so quickly or so well as by seeing to it that dental schools and dental education are both placed upon a good sound basis, encouraged and supported by our best and strongest men.

Following the reading of these papers extended remarks were made by a number of gentlemen, for which we have only space to offer extracts.

Dr. J. E. Garretson. * * We have assembled to-night to discuss the matter of education pertaining, or to pertain, to our specialty; and on the subject I desire to say a few earnest words.

I know of dental colleges as these exist in my own city, and it is doing these but slight justice to assert of them, that, if the practice of the specialty is to remain as it now is, better means are not needed in the way of educational facilities. But just here is our difficulty: things are not to remain as they are; and hence higher things call for higher requirements, and these requirements must necessarily be met. We are to be higher in the professional plane, or we must be lower; mere mechanical manipulations, however beautiful and however useful they may be, are not found substantial enough to longer support a doctorate. The goldsmith is not unwittingly asking why he too is not a doctor. Our specialty is to be that of Oral Surgery; in this we will still be dentists, but we will be something more.

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To be an oral surgeon presupposes the possession of the common medical degree, but in this there is no reason why our dental colleges should go out of existence; but necessity does arise for a transformation in them; for the abolition of the special and peculiar degree, and for their conversion into medical schools, having, perhaps with advantage, special facilities associated for the teaching and the training of the oral surgeon.

A special degree may not but be deemed adverse to a common medical standing, and as success in oral surgery is success in medical knowledge, it should be our aim to profit by a common fellowship. To say that we need no such fellowship, and to argue for the superiority of a specialist over the circularly educated man, is to exhibit a weakness which I am glad to say I have not seen in my visit here among you.

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The subject, however, of manner of education, may not be settled to-night, but let every man take the consideration of the matter home with him, and when again we meet, let it be that we have determined our future. To-morrow let each one begin to study up the grand specialty of oral surgery.

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Since reading, in the current number of the journals, the report of a discussion which so fully elicited the views and feelings of many prominent members of the dental specialty during the late session of the American Association, concerning the matters of education and degrees, I have rested in the conclusion that any continued agitation of the subject, on my part, is entirely unnecessary, and, if indulged in on the present occasion, would be occupying time without benefit.

Any one whose forecast and whose intelligence lead him to observe the signs of the times, may not for a moment doubt that the present position of our specialty cannot continue as its status in the future. And the reason is a very plain and simple one: it is the story of growth, of development, of evolution.

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But new departures imply a move, and where shall such movement as is at present required have better origin than just here, in the midst of that which constitutes the intelligence of the profession?

I speak advisedly when I assert that there are medical colleges, with all possible facilities, ready to assist with might and main the dental profession to make such new departure; ready to welcome warmly among their alumni all who desire to come; ready to abolish all distinctions, and to stand on a platform of common brotherhood. But such colleges properly wait an invitation to act.

Most decidedly am I, for one, in favor of the abolishment of the degree of D.D.S. One degree in medicine is enough; the greater covers the lesser, and includes it. A doctor in medicine possesses a title quite extensive enough in its signification to embrace any specialty that he may elect to practice; besides, it affords the only possible bond of brotherhood with the members of the profession at large. We may be specialists, but we can never be esteemed as doctors, in the desirable fullness of the term, until we replace the D.D.S. with the M.D.

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Dr. T. L. Buckingham, of Philadelphia. I am probably as much interested in dental education as any person here. I have been trying to teach dentistry for over twenty years (twenty-three), and I would say to those around us who find fault with what we have done, Go and do the work better.

We are ready to advance as fast as the profession will enable us; we have high aspirations, but we have not been able to put them into practice. I think if we were to establish dental education on so high a standard as some think we should, it would be practically a failure.

The advancement of collegiate education over the old office instruction is a tremendous stride, not only in point of time, but expense, to the student, and if we should now add much longer time and expense, it is a question whether many who now come to our colleges would be able to attend. The time and requirements of our dental colleges are now as long and as rigid as the best of our medical institutions.

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I believe no dental institution at the present time requires a thorough medical education for its graduates; even those that are in connection with medical colleges only require the dental student to take the tickets of some of the medical professors, and therefore their graduates cannot be classed with the medical graduates.

I do not object to a thorough medical education; in fact, I would recommend any one who has the time, means, and the capacity, to obtain not only a medical education, but all the knowledge he can in every branch of science. But is a medical education at the present time essential to a practitioner of dentistry? Does not dentistry as it is now practiced require all the talent and skill that an ordinary person can give to it?

Graduates of dentistry are now better qualified to practice their profession than graduates of any other specialty; for they receive not only theoretical but practical instruction in our colleges, so that when they go to practice their profession, they do not labor under the same difficulties that others do who have only been taught theoretically.

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Does not the profession demand more of the graduate from a dental school than is demanded of any other? When a medical graduate opens an office, if he has been a good student his friends say, When he gets some practice he will be a good doctor; or when a young lawyer is admitted to the bar, When he gets practice he will be a good lawyer; and so with other professions; but a young dentist is expected to be thorough in all his operations at the commencement.

We admit that all who graduate from any institution should be qualified to practice their profession, but to suppose that all should be equally qualified is to demand what no institution can guarantee; some will be better than others in all classes, and some will advance after they have graduated, while others will retrograde. College instruction is only intended to qualify graduates to commence the practice of their profession.

In regard to the limits of our profession in certain directions, there is wide difference of opinion. In the mechanical manipulations we have no difficulties in separating it from other professions, but in the medical and surgical branches there appears to be no limit. If we treat all the systemic diseases that affect the teeth, we must take in the whole of medicine and surgery, for there are few diseases which do not affect the teeth, either locally or through the general system. If we even undertake to treat all tumors of the oral cavity, we would have to perform some of the most difficult surgical operations, and to treat the other diseases that affect it would require a thorough knowledge of medicine, and the question now is, Can any one person become thoroughly qualified in surgery, medicine, and dentistry? Are not these different branches better separated? And although we may not be able to draw a distinct line between them, still, there should be a limit to each; but I would say, if any one is qualified to practice all, let him do it. I am in favor of every one doing anything he can do well, so that he does not interfere with his neighbor.

Skill to manipulate, talent to understand, and executive ability to carry on a profession are not often found combined in the same person, and therefore we have many who can perform good operations and yet know little of the treatment of the diseases of the mouth; and if they perform their operations well and conduct the business of their office in a satisfactory manner, they are usually considered good dentists, although they do everything by routine.

There is one difficulty which the dentist labors under that does not attend a doctor, and that is, his work shows. A doctor may give a wrong prescription and his patient get well, but if a dentist does his work badly, it will show against him.

I can assure you, gentlemen, that the dental profession is advancing as fast, if not faster, than any other, and that dental colleges are performing their share of the advancement. Many of the young and advancing members of our profession are graduates of these institutions.

Dr. C. A. Marvin. * * No subject has for me greater interest than this, and I am willing to go as far as any gentleman in advocating the highest attainment in the matter of education. I will place myself by the side of him who is in the front rank in his views on this question. I believe in the fullest, completest education as not a whit too great for him who is to become a dental practitioner. And when I say fullest education, I do not mean in one direction only, but in all departments that affect in any degree the operations he has to perform.

The organs which the dentist has to deal with are among the most delicate in the entire human frame, and their connections and relations are so intricate and yet so intimate, that to treat them properly requires a thorough acquaintance with the anatomical and physiological relations which subsist, not only between the organs and contiguous parts, but between the organs and the great centers of life, sensation and motion.

The effect of disease in one part upon the health of another part; the kind reception or persistent rejection of remedial treatment which different conditions of the general health incite among the teeth, and which follows which; the propriety of systemic treatment as preparing the way for and rendering more efficacious local treatment, and all such knowledge,—is not this valuable? Is such knowledge not necessary to-day to the competent dentist? There is more required of our profession to-day by the public than there was twenty years ago. They are aware of the claims put forth by the profession, and they mean to put those claims to the test.

The more the public demand of us, the more clearly will the value of higher education stand forth. And equally, the more clearly practitioners discern the possibilities of dentistry, the more resolutely will they determine that those possibilities shall be realized. All this will be the result of education, and nothing but education will accomplish it. Let us have it, therefore, let us advocate it, let us urge it. I go with the foremost.

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Another point I wish to make is this: no department of a dentist's education should be deemed of inferior importance to another. There are specialties within specialties, I know, and instances may exist where it is well. Dentistry is a specialty of medicine, and, although a compound pursuit, should be wholly understood and every department rightly valued.

Oral surgery is an important department, but it is not all.

Treatment of diseases of the teeth and buccal cavity is another important department, but this is not all.

The preservation of the teeth by filling, cleansing, etc., is another department, but this does not comprise the whole.

Supplying substitutes for lost parts, and restoring features,—this is of vast importance, but this alone is not dentistry.

All four of these departments enter into the complex profession of dentistry, and no one of them can with any propriety be undervalued or ignored.

This naturally leads me to one further topic, which completes the round of thoughts in my mind when I rose. If what has been said is so, then the remaining question comes up, How can the needful education be best gained?

And just here I wish to say that there seem to be floating about certain obscure ideas regarding the efficiency of dental colleges,—a vague impression or charge that they are unequal to the want of the day. I say vague and obscure, because I do not hear them openly and frankly spoken. I only gather them from certain hints. Hence I may be wrong in my premises. One thing is certain, I am speaking in the dark. I would rather speak to uttered sentiments. But a word or two, with your permission, on this subject, I will add. If there be any such feeling in respect to existing institutions, let it be outspoken and frankly considered. I do not believe any teacher in any school of dentistry to-day would hesitate or object to enter into a full and candid examination of this important subject, viz.:

Whether the dental colleges of to-day are equal to the needs of to-day.

Whether they are capable of imparting such an education as a dentist ought to have.

Whether they can be raised to a higher standard of excellence themselves, and be induced to require a higher standard of attainment for their students, if it should be deemed necessary.

Whether any advantage would be secured by attaching dental instruction to medical, and gaining both in a medical institution, or whether the desired end can best be attained by sustaining independent institutions.

These are questions which can be discussed. Certainly no "new departure" can be looked for without a previous examination of the matter,—that is, no general one, none which will command anything like general support; and I am certain no good can come of divisions in the profession on so important a matter. I will not commit myself to-night on this question, because it may be one of my own imagination.

A "new departure" has been mentioned; I cannot commit myself to it without knowing what it is, and it has not been explained in my hearing. Let there be fairness and frankness about this matter, and I have no doubt if it is presented (if there be any *it*) in such a manner, it will be met by the profession and by professors in the same frank and earnest manner.

Dr. T. C. Stellwagen. * * We are not ashamed to acknowledge that dental colleges are not what we would like them to be; but will you show me any school that is what it ought to be,—anything human that is perfect?

I ask you, gentlemen, not to desert that degree. We have fought a battle and won a victory, and are we now to turn and throw aside the banner of victory and take up a new one? I will venture no one will say "yea" except those that have had the degree conferred upon them without pains and labor. It is labor that will make our profession stand famous among the professions.

In regard to dental schools, as I said a few moments ago, I should like to know of a medical school that requires more than one course of study and five years of practice. I believe that a majority of all medical colleges to-day, if we credit their announcements, will accept five years of practice as the requirement of one course of instruction. But I am opposed to it; think it is a great error; and am proud to say that the Philadelphia Dental College (at a future period, 1876) will require two full courses; because we recognize the error that so long as we allow five years of practice to be equivalent to a course of lectures, it is an inducement for men who are not qualified to go into practice. I desire to see dentistry advanced, and, for one, am determined that so long as I am able to raise my right hand for it, I will do so. I would not accept any position in which the dental faculty is subsidiary, auxiliary, or inferior, and am proud to find that Dr. Garretson now indorses the same opinion. I learned while a sailor, when aloft, never to let go with one hand until I could get hold with the other. You have climbed aloft and reached the royal yard-arm, and gentlemen want us now to let go with both hands, in hopes that something will sustain us. Are we to give up the certainty that we have, for an anticipated something that may be a mere delusion? Our growth has been wonderful, but only strong in proportion as it is slow,—a sign of the intense vitality of our profession. It is slowly, steadily, and surely advancing over all obstacles; it is destined to be a leading, if not the leading, specialty of medicine. Nutrition lies at the foundation of everything in life, and where is the entrance of nourishment but through the mouth? Consequently, it will be the dentist of the future, call him what you may, who will hold the key to the citadel of life, and it is he who will be respected and honored above all others. By means of the perfect systematizing of his hours of practice and study, and the freedom from interruption he may enjoy while so occupied, the dentist should become learned and thorough as but few of the practitioners of other medical specialties can.

(To be concluded.)

AMERICAN DENTAL ASSOCIATION.

The fifteenth annual session of the American Dental Association will be held at Niagara Falls, commencing on the first Tuesday (3d) of August, 1875, and continue in session four days.

AMERICAN DENTAL CONVENTION.

The twenty-first annual meeting of the American Dental Convention will be held at Long Branch, N. J., commencing on the second Tuesday in August. There is no permanent membership in this organization, and no initiation fee. Dues are collected only from those attending the meeting. All dentists are cordially invited to be present. Essays upon various subjects will be read, and interesting and instructive clinics given by prominent members of the profession.

Ambler Tees, *Recording Secretary.*

DENTAL SOCIETY OF THE STATE OF NEW YORK.

The seventh annual meeting will be held at the Capitol, Albany, commencing Wednesday, June 30th, 1875, at ten o'clock A.M., and continue in session three days.

Charles Barnes, *Secretary.*

NEW JERSEY STATE DENTAL SOCIETY.

The fifth annual meeting of the New Jersey State Dental Society will be held at Long Branch, on Tuesday, the 6th day of July, 1875. All dentists are cordially invited to attend.

J. W. Scarborough, *Secretary.*

IOWA STATE DENTAL SOCIETY.

The thirteenth annual session of the Iowa State Dental Society was held at Cedar Rapids, Iowa, commencing on May 18th.

Dr. C. P. Artman, M.D., Waterloo, was elected *President;* Dr. I. P.

Wilson, D.D.S., Burlington, *Corresponding Secretary;* Dr. R. L. Cochran, D.D.S., Burlington, *Recording Secretary.*

After a pleasant and interesting session, the society adjourned to meet at Burlington, May 19th, 1876.

EUGENE T. RIGBY, *Recording Secretary.*

MINNESOTA STATE DENTAL ASSOCIATION.

THE Minnesota State Dental Association held its annual meeting at St. Paul, May 26th, 1875.

The following gentlemen were elected officers for the ensuing year:

President.—Dr. F. A. Williamson, Redwing.

Vice-President.—Dr. P. S. Calkins, Minneapolis.

Secretary.—Dr. W. F. Lewis, Winona.

Treasurer.—Dr. J. H. Bryant, St. Paul.

Adjourned to meet at Minneapolis, in May, 1876.

WISCONSIN STATE DENTAL SOCIETY.

THE fifth annual session of the Wisconsin State Dental Society will meet at the Newhall House in the city of Milwaukee, Tuesday morning, July 20th, 1875, and continue in session three days.

EDITORIAL.

HORACE WELLS.

ABOUT two years ago the legislature of Connecticut and the municipal authorities of the city of Hartford appropriated the sum of five thousand dollars each for the purpose of commemorating the discovery of Anæsthesia, by the erection in the Hartford City Park of a colossal bronze statue of Horace Wells.

The committee having the matter in charge now make an appeal to the public, but chiefly to the medical and dental professions, for the means to secure a suitable bronze pedestal, which, by bas-reliefs and inscriptions, shall properly honor the discoverer.

Horace Wells is honorably entitled to be ranked as one of the world's benefactors, and, as such, to be held in loving remembrance by mankind; especially, it would seem, by his countrymen, and still more especially by the profession to which he belonged, and the medical profession, who know so well the inestimable value of the discovery; for it must not be overlooked that to Horace Wells belongs, as growing out of his suggestions in reference to nitrous oxide, the whole idea of producing insensibility to pain during surgical operations.

We should be glad to learn that the appeal of the committee had met with a generous response.

Letters of inquiry may be addressed to Dr. E. K. Hunt, Chairman of the Committee of the Hartford Medical Society.

Subscriptions may be forwarded to Dr. G. W. Russell, Treasurer, Hartford, Connecticut.

THE ANNUAL CONVOCATIONS.

According to adjournment, the American Dental Association will hold its fifteenth annual session at Niagara Falls, commencing on the first Tuesday (3d) of August, and continue in session four days.

The American Dental Convention will hold its twenty-first annual session at Long Branch, commencing on the second Tuesday (10th) of August.

PERISCOPE.

Dental Pathology and Surgery.*—A recent review gave us occasion to remark that few branches of the surgical profession were making more comparative progress than that of dental surgery, and it is now our duty to criticise a book the high character of which seems to us to be worthy of a few special remarks, for which we would crave our readers' patience, as a prologue to our task. We have always maintained that the specialty of which we speak should, under certain conditions, be looked upon, of right, as a branch of surgery; of course we speak of it in its highest and most extended view, for, when so considered, it will be seen that no practitioner can do full justice to those who come under his care unless he possesses an adequate knowledge of the principles of medicine and of surgery. These views are confirmed by a distinguished surgeon, Mr. Savory, who, in the course of an excellent address† given by him on the subject of dental education, whilst urging his hearers to take advantage of the highest general professional study, begs them "to thoroughly realize the fact that the teeth are parts of the living body and hold important relations to various other parts; that they are not isolated structures in their diseases and morbid actions," and "that, in a word, although they have, as every other part has, a special, they have not, nevertheless, an isolated pathology, and this because, although they have, as every other part has, a special, they have not, nevertheless, an isolated anatomy and physiology."

In America the medical papers have been indulging in an exciting discussion as to the status of those who practice dentistry‡ in relation

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* Dental Pathology and Surgery, by S. James A. Salter, M.B., F.R.S. 1874.

† An Address on Dental Education, by W. S. Savory, F.R.S. 1874.

‡ Looking at the case of those who by insufficient general education are only qualified to practice the specialty in a purely mechanical point of view.

. . . The most eminent men in America are working to bring about such a standard of education as exists in England, and we think it due to them to quote to the medical profession, refusing to grant an equal position to dental practitioners, and we think with every reason, *unless* they have a *medical* qualification.

Two of the great objections to all professional examinations in America are these: Firstly, no preliminary tests of a liberal general education are required. Secondly, most schools, whether special or general, confer their own diplomas. In England all is different. Recognized institutions alone can grant degrees, and the consequence of this most healthy system is that, socially, with many brilliant exceptions across the Atlantic, a higher type of man is found in the ranks of our profession. We shall ever support the view that every so-called "dentist" should hold at least a surgical degree, which is for the most part the case with all the more distinguished members of that specialty, though it is not as well known as it should be, even among professional men, that a special degree is granted by the Royal College of Surgeons, which is known by the appellation of Licentiate in Dental Surgery, or by the letters L.D.S., this degree implying such an education in a general hospital in the subjects of medicine, surgery, anatomy, etc., as may be gained during a two years' course of study in any of the London and in some of the provincial hospitals, this being additional to a special curriculum which also extends over a period of two years. Such a diploma, emanating from a body so distinguished as that constituting the College of Surgeons, cannot but be of great value, though we look forward to the time when the degree of L.D.S. like that of L.M., a collateral degree, may only be taken as accessory to the membership or fellowship of the college, this insuring in addition to other benefits the incalculable advantages of a preliminary test in the subjects of a liberal education. However, *Chi va piano va sano e lantano.* We cannot expect everything to be done at once; great advances have been made in a brief period, and we trust that ere long every dentist will be a fully qualified practitioner, so that he may rightly be termed a dental surgeon.

As a member of the staff of a large metropolitan hospital we have been much struck with the ignorance of even advanced students exhibited in relation to diseases of the teeth, some acquaintance with which is of no slight importance to every surgeon, for very serious operations have been undertaken in connection with the jaws where a modicum of special knowledge might have rendered comparatively trivial measures quite as successful.

It is a great error to think that even the lesser operations undertaken by the dental surgeon are by any means simple. They have to be performed under considerable difficulties. Light and perfect freedom from moisture are necessities, both being difficult to obtain, whilst manipulations of the most delicate character have to be undertaken in very small

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an expression of opinion which has come to our notice since this review was written, by Dr. Garretson, who has not only the reputation of being one of the first operating surgeons in America, but is also a distinguished dental practitioner. In a recent article in the *Philadelphia Medical Times*, he says,—"A mere specialist cannot, and should not, be received into the common brotherhood of medicine without his coming to a common platform as regards all that makes the doctor. The ophthalmic surgeon has recognized this; and to-day he holds just such a position as it is desirable he should enjoy,—he has his special hospitals, but he has no college, no peculiar diploma.

"His general education is *alike* with his medical brethren, and therefore his privileges are the *same.*"

cavities, placed again within an area—the oral cavity—itself of no great dimensions.

It must also be remembered that in many cases it is the province of the dental surgeon to see the first signs of diseases which by timely interference could be shorn of their chief terrors; witness the case of certain tumors of the maxillæ, the incipient signs of amaurosis when the result of dental lesion, and epithelioma of the tongue which has been too often mistaken by the patient for a simple ulcer. It is not long since we saw a case of this disease which had been treated by a medically unqualified practitioner as a simple abrasion by the potent remedy of tincture of myrrh and water, much to the patient's satisfaction, until the disease was so far advanced and the glands so much involved that all operative interference was quite out of the question. The confiding patient had been thus treated for two years, with no desire to seek further advice.

Whilst insisting upon the importance of a knowledge of medicine and surgery to the dental practitioner, we would conversely impress upon his medical confrère the advantage of some knowledge of dental diseases, for thereby hints may be obtained for treatment which might not otherwise present themselves. Cases will be given to prove this proposition in the course of this article.

At present the chief means of education in dental surgery is at a special hospital, in which the teaching is as good as any to be obtained, but, for the reasons we have stated, we look forward to the time when every general hospital will have a *special* department for the instruction of students in all that concerns diseases of the teeth, which instruction shall be received by the College of Surgeons as fulfilling the necessities of the curriculum required by it. We do not for one moment wish to reflect upon any well-conducted special institutions as long as their only object is help to the needy and instruction to the learner apart from all cliqueism and self-interest on the part of those conducting them. Many of them have been undoubtedly of the greatest service in the treatment of disease, but we think that, as a general principle, every large hospital should do all in its power to give instruction within its walls in *every* branch of medicine and surgery. In saying this we by no means speak of dental surgery alone, though it gives us pleasure to state that its importance has been fully acknowledged, and that two hospitals in London have already instituted special departments in this branch, lectures being given in every subject connected therewith.—*Remarks Prefatory to Bibliographical Review, in British and Foreign Medico-Chirurgical Review.*

THE BRITISH DENTAL ASSOCIATION.—We have received from various quarters most satisfactory evidences of sympathy with the movement we proposed in our last issue.* We are carefully collecting together those whom, we believe, the profession will accept as a provisional executive committee, so that adequate means may be taken to secure the support of the entire body of dentists who are practicing their profession in a legitimate manner.

Without expressing what may be the exact laws on the subject, we may state broadly that all practitioners who advertise their professional attainments and capabilities in the public press, will be ineligible as members of the Association; and the same remark applies to those practitioners who choose to adorn their door-posts with hideous examples of dental abnormalities, or brass and zinc signs containing in the centre some choice specimen of dental manufacture. Those gentlemen, we say, will most certainly be ineligible for the membership of the British Dental Association. If they voluntarily choose to practice a profession as if it were a trade, they must not be surprised if those who practice in a professional spirit hold aloof from them. The former class have the pecuniary advantage which their trade customs confer, and with this—since they have so elected—they must be content.

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* The organization of a British Dental Association.—Ed. D. C.

To those, however, in all parts of the country, who are striving honestly to conduct their professional work in a proper spirit of self-respect, and regard for their position as allied practitioners to the great body of medical men, the Association will offer and confer the greatest possible advantages; since the election of some and rejection of others in the various towns of the provinces will afford a ready means whereby the public may know who are deemed fit and proper persons to be recognized as true dentists; we say "true" dentists advisedly, for in the absence of any prohibitory legislation there is nothing to prevent the tinker of to-day becoming the dentist of to-morrow, and if he be only possessed of sufficient impudence, it may be safely predicted that he will attain to a sufficient degree of success to injure the honorable practitioner, who, with high-class skill but some modesty, declines to put himself in competition with a man that he utterly despises. Yet what can he do? if he tell the truth as to the origin of his "brother practitioner," it is put down to jealousy or fear of a rival; if he be silent, he has very often the satisfaction of knowing that he is starving on respectability, whilst the man who willfully advertises that which is untrue, and vulgarly obtrudes his calling upon the public by means of handbills and show-cases, grows rich through the credulity of a public that still insist on believing in the pretender with the loudest voice and fewest scruples.

In thus helping the dental practitioners throughout the country in the maintenance of their professional and social position, by affording clear testimony as to whom their brethren deem worthy of recognition, the British Dental Association will accomplish an amount of reform that has hitherto been unattainable by any existing organization.—*Editorial in Monthly Review of Dental Surgery.*

Recent Progress in Anatomy.—The last chapter of Dr. Harrison Allen's work on the Facial Region is devoted to an attempt to apply the principles of evolution to the nomenclature of the teeth of a single dental formula. In other words, the author, if we understand him aright, wishes to show that the more complicated teeth consist solely of aggregations of the elements that compose the simpler ones.

As is well known, there is in certain animals a band of dental substance on the side of the tooth, called the cingulum, which, as it is rudimentary in man, Dr. Allen proposes to call the cingule. In the incisors and canines it can be pretty clearly seen on the posterior surface; in the bicuspids it becomes larger, and, having a fang under it, it is really a cusp, technically the bicuspid cusp, as it is from its presence that the tooth derives its name. The marked development of a new cingule, and the appearance of still another, converts a bicuspid of the upper jaw into a superior molar; while in the lower jaw two fully and one imperfectly developed cingules are necessary to form an inferior molar. The shape of the wisdom-teeth is attributed to reversion. The idea is certainly ingenious and suggestive, but, as is the case with applications of the evolution theory in general, there are some rather large links missing.—*Thomas Dwight, Jr., M.D., in Boston Medical Journal.*

DENTAL SURGEONS.—At the written examination for the license in dental surgery of the Royal College of Surgeons on January 8th, the following questions on anatomy and physiology, and pathology and surgery, were submitted to the candidates. The candidates were required to answer at least one of the two questions both on anatomy and physiology, and on pathology and surgery.—*Anatomy and Physiology:* 1. Describe the attachments of the buccinator muscle, how it is engaged in mastication, and whence it derives its vascular and nervous supply. 2. From what source is the fluid in the mouth derived? State the principal causes which influence the amount formed, and explain how those causes act.—*Pathology and Surgery:* 1. Describe the origin and development of a cyst in the lower jaw. How would you distinguish it from other tumors in this region? and what does it usually contain? and state how you would treat it. 2. Describe the treatment you would adopt in continued hemorrhage after excision of a portion of a tonsil. In dental anatomy and physiology, and in dental surgery and pathology, candidates were required to answer at least *two* out of the three questions on each subject.—*Dental Anatomy and Physiology:* 1. Explain fully the different theories concerning the formation of dentine, especially in relation to the tubuli. Of what do their contents consist? and how may they be pathologically affected by disease? 2. State the ages at which the eruptions of the deciduous and permanent sets of teeth commence, and the ages at which they are respectively completed. Describe the characters by which you would distinguish between the first and second molars of the deciduous set, and between the first and second lower molars of the permanent set. 3. Explain the several circumstances which conduce to the protrusion of the chin and the shortening of the face in old people; and describe the ways in which artificial teeth rectify such conditions.—*Dental Surgery and Pathology:* 1. Draw a distinction between toothache arising from diseased conditions of the teeth and pain in teeth arising from constitutional causes. Name the constitutional conditions and diseases which principally affect the teeth. 2. Describe the conditions under which certain of the permanent teeth in the adult may be wanting from the mouth when none have been extracted. Point out the particular teeth most frequently absent, and state the circumstances which probably explain such deficiencies. 3. What are the different varieties of united teeth, and the nature of the union? State the probable causes of such union between contiguous teeth, and the consequences to which that condition may lead.—*British Medical Journal.*

ON RESECTION OF THE INFERIOR DENTAL NERVE.—Dr. Stetter (*Berliner Klinische Wochenschrift,* No. ii. 1875) reports a case in which Prof. Schoenborn, of Konigsberg, removed a considerable portion of the inferior dental nerve by first dividing it in the mouth of the patient, and then by removing part of the anterior wall of the dental canal. The patient, who was a woman aged sixty-four, had lost most of her teeth before the age of thirty, when, in consequence of fright, she suffered during a period of three months from occasional attacks of severe cramp and painful convulsive movements of the limbs. When forty-eight years of age, she was again much frightened by the attack of a dog, and from that time suffered from frequently repeated attacks of spasm and pain on the left side of the face, the intervals between these attacks having, up to the time of her admission, become more and more frequent. When first seen by Professor Schoenborn, the patient, who was much emaciated, complained of very severe radiating pains on the left side of the face, especially about the lower jaw. The intervals between the attacks varied in duration from five minutes to a very few seconds, and during each attack the affected side of the face was fixed by muscular spasm. The woman was able to ease the pain by simultaneous pressure with her fingers on the inner surface of the lower jaw in the region of the aperture of the dental canal, and on the outer surface of the bone. After the patient had been treated for two weeks by injections of morphia without any good result, Professor Schoenborn decided to have recourse to neurectomy. As the patient referred the most intense pain to the region of the inferior dental canal, it was held that the cause of the affection might probably be found in the portion of nerve which was contained therein, and that a cure might be effected, or at least considerable relief afforded, by removing that portion. With this object in view, Professor Schoenborn first divided the inferior dental nerve in the mouth near the aperture of the canal according to Paravicini's method, then cut down upon the front of the lower jaw and removed with the chisel a portion of the anterior wall of the canal, and finally pulled out and excised a portion, about six centimetres in length, of the inferior dental nerve. In the first stage of the operation an incision was carried along the inner surface of the lower jaw over the course of the inferior dental canal from the aperture downwards and inwards, and afterwards for a short distance upwards towards the neck of the bone. The mucous membrane and periosteum were cut through and elevated along the whole of this wound, and the loose cellular tissue between the internal pterygoid muscle and the ramus of the jaw partly pressed on one side by the fingers and partly removed. After some slight bleeding had been suppressed, the lingual nerve could be seen, and behind it, on the outer surface of the internal pterygoid muscle, the inferior dental nerve and artery imbedded in cellular tissue. The lingual nerve having been drawn aside by a small blunt hook, the inferior dental nerve was carefully dissected away from the artery and inclosed near the aperture by a ligature, the two ends of which were brought out of the mouth. The anterior wall of the canal lining these, in the second stage of the operation, was chiseled away over an extent of one centimetre and a half; the nerve was divided as far as possible above the aperture of the inferior dental canal, and then dragged out through the external wound. The dissection of the parts within the mouth and the division of the nerve were much facilitated in this case by the absence of teeth and the absorption of the alveolar process of the lower jaw, the conditions being similar to those met with in infants and very old people, and generally in edentulous subjects. On the first and second days after the operation there was no relief; on the third and fourth days the neuralgic pains were not quite so severe, and on the fifth day they ceased altogether. When seen six months after the operation, the patient was quite free from pain, and stated that she had not suffered from any relapse.

Dr. Stetter holds that Paravicini's method of dividing the inferior dental nerve within the mouth is to be preferred to the subcutaneous method, since in practicing the latter it is difficult to avoid wounding the lingual nerve or the inferior dental artery. In conclusion, he argues that neurectomy in cases of neuralgia, though very uncertain in its results, may be considered a justifiable operation when applied as a last resource for the relief of very severe and intractable forms of this affection.—*London Medical Record.*

ON RANULA.—*L'Union Médicale* of June 25th and 27th, contains a paper by M. Forget upon foreign bodies in Wharton's duct, and their connection with ranula, which was read at the Surgical Society. M. Forget deals critically with two papers bearing on the subject, the one by Dr. Claudot, the other by Dr. Ferrier.

M. Claudot's consists of two parts. In the first he narrates various cases of ranula, and concludes that they differ in their origin, their seat, and their nature. Hence, he classifies them into—

1. Mucous cysts (dilatations of the muciparous follicles).
2. Salivary cysts (distensions of the salivary ducts).
3. Serous cysts (Fleischman's bursa).
4. Dermoid cysts (closed cavities of new formation).

M. Forget, passing over the earlier parts of the essay, takes exception to the serous cysts which are said to have their origin in Fleischman's bursa. M. Claudot gives no proof of the anatomical existence of such a bursa. He only says that in 1842 Fleischman believed he had discovered one in the linguo-maxillary furrow, and that he there fixed the seat of ranula. But, unfortunately, the description Fleischman himself gave of it showed that it was nothing but the lax cellular tissue which all anatomists have recognized in that situation. Neither does Jobert (De Lamballe), who follows Fleischman, give any anatomical proof of the existence of the bursa. According to him, the direction and shape of the serous cyst itself indicates the situation and direction of the bursa, which has been its original point of departure. The tumor, he says, becomes prominent at the side of the tongue. It is never situated in the central line, because of the resistance of the thick muscular plane there formed by the genio-glossus, the genio-hyoid, and the digastric muscles; it tends, therefore, to place itself at the sides, and to insinuate itself between the muscles and the submaxillary gland; it may develop itself on both sides, and may become prominent at the same time both in the neck and in the mouth.

Now, says M. Forget, it is incontestable that sublingual tumors which offer these clinical features form the great majority of what are commonly called ranulas; must we then conclude with Jobert, not merely that they occupy a closed cavity formed at the expense of the laminated tissue, but even that they arise in a pre-existing natural cavity, which was discovered by Fleischman and rediscovered by M. Tillaux? It must rest with anatomists to decide who are right; but at present the balance of authority is against Fleischman. M. Tillaux says the bursa is not always found. Well, then, it has probably no very important physiological use; and this leads us to ask whether, when it exists, it is not merely accidental or abnormal? If it had a physiological use it would be constant.

M. Tillaux has striven to show that the accumulation of saliva in this cavity, from a communication with Wharton's duct, gives rise to cases of acute ranula. But the proof is defective, while on the other hand M. Dolbeau has cited cases of acute ranula arising spontaneously, whose sudden appearance could not be explained upon the theory suggested by M. Tillaux; and the author has himself reported a case of the same kind which could not be explained in this manner. There is, therefore, need for further investigation before the point can be considered settled.

The second part of M. Claudot's essay is occupied with lesions of the salivary ducts, produced by foreign bodies in their interior. Of these foreign bodies some are introduced from without; others, such as salivary calculi, have their origin within.

A few examples are given of foreign bodies introduced from without. The first is that of a shoemaker, who had a painful swelling in the region of the submaxillary gland, with ulcerations at the orifice of Wharton's duct. A probe was passed, but no calculus or other foreign body could be felt. Three months later the patient complained of pricking pain under the tongue. The surgeon examined the floor of the mouth, and drew out a pig's bristle, such as the man used in his trade. He speedily recovered.

The next case is that of a soldier, who had a fluctuating tumor the size of a pigeon's egg, beneath and to the outer side of the tongue, in the region of the submaxillary gland.

There was also a second almond-shaped swelling of which the narrow end corresponded to the orifice of Wharton's duct. M. Claudot thought at first that these swellings were probably connected with a concretion in the salivary ducts. However, after making a close examination, he came to the conclusion that there was no foreign body present. After using palliative treatment for a week with little effect, he slit up the orifice, and the bistoury struck a small, rough body, which was drawn out, and proved to be a fragment of an ear of corn, upon which the salts of the saliva had formed a concretion. The cure was rapid and complete.

A third case is that of M. P., who, after having supped upon fish, awoke in the night with sharp pain and swelling in the region of the submaxillary gland. Leeches were applied, and some relief given. Between 1837 and 1842 the patient suffered two sharp attacks similar to the first. All this time the swelling continued; the pain got worse and worse, the tongue deviated, and mastication was impeded till at length M. P. could only take fluid food. It was not till 1842 that the surgeon probed Wharton's duct, and detected a calculus, which he proposed to remove on the morrow. After this probing the patient felt a pricking pain under the tongue, and, placing himself before a looking-glass, he observed a sharp-pointed stone protruding, which by the aid of a large pin he succeeded in extracting for himself. The concretion was cone-shaped, and was formed around a fishbone.

Though such cases are comparatively rare in the human subject, they are said to be common in horses and other domestic animals. Immediate removal is the essential point in the treatment, otherwise a false passage may be the result. The following case treated by M. Ferrier illustrates this:

A patient, R., had a tumor on the level of the lower jaw, which had been growing for two years. Six months before his admission to the hospital this began to press on the tongue, while it increased also on the outer side; and there was a whitish, fetid discharge on the level of the frænum. A month later a smooth white stone of conical shape came away. The base was rough, as if the calculus had been broken off from a larger concretion, which remained behind. The patient got somewhat better, but as the symptoms returned and it was evident that there was still some concretion in the salivary passages, and that the gland was inflamed, Mr. Ferrier (wrongly, as M. Forget thinks) made an incision on the outside of the neck, as if he had been going to tie the lingual artery, and dissected out the submaxillary gland. No concretions were found in the gland-tissue, which was only inflamed. A few days later, caustic was introduced into the wound, and subsequently caustic arrows were inserted. When the eschar separated, a fistulous track was felt, and the fetid discharge continued. At length, after the patient had suffered much, the fistula was examined with the finger, and a hard substance was felt. The fistula was dilated, and a calculus removed. The fistula then speedily healed, and in two months the patient was well.

M. Forget condemns the treatment adopted in this case, and says that the second portion of the calculus ought to have been removed from the mouth like the first, and that the submaxillary gland should have been left entire—*London Medical Record, and Monthly Abstract of Medical Science.*

HEMORRHAGIC DIATHESIS.—Dr. Hadlock, of Cincinnati, reported to the Cincinnati Academy of Medicine (*Clinic*, Nov. 21st, 1874) the following cases:

Was called to a mulatto boy, aged seven years. Found him bleeding from the mouth, and an examination discovered that the hemorrhage was caused by the decayed snag of a tooth which had become loosened. He at once removed the tooth, supposing that the hemorrhage would then cease, but, on the contrary, it increased and became quite alarming in character. He then applied a compress, steeped in a solution of persulphate of iron, and thus checked it for a time.

Was called again to the case in the night, and found the hemorrhage was going on more violently than before. Now cauterized the point with nitrate of silver, also gave astringents internally, and succeeded in arresting it once more. After a time it recurred again during the doctor's absence, and Dr. Dandridge was called to the case. He applied ice, and gave aromatic sulphuric acid, but without avail. All the various styptics and astringents were tried in vain, and the boy died at the end of forty-eight hours. On inquiring into the history of the boy's family he found that many of its members had died of hemorrhage from slight wounds. An uncle of the boy had cut himself slightly with a scythe and died in consequence. His father had received a slight scratch from a brier and bled to death. Two other brothers had died of consumption. It was evidently an instance of hereditary tendency to the hemorrhagic diathesis.

Dr. M. B. Wright said he remembered a number of cases in the past, one in particular occurring in the practice of Dr. Gross, when he was a resident of Cincinnati, in which a child had died of hemorrhage after scarification of the gums.

Had also seen a family under the care of Dr. Worcester many years ago in which the hemorrhagic tendency existed in a marked degree, the smallest wounds resulting in severe and almost fatal hemorrhage. A case of his own had repeated hemorrhages, which he found it difficult to control. During one of these attacks administered sulphate of magnesia as a purgative, and to his surprise the bleeding was arrested. Tried it repeatedly in subsequent attacks in the same patient, and always with success. Now uses it in pulmonary hemorrhage in doses of a teaspoonful repeated every three or four hours, with the best results. Had lately used it in several severe cases of hemorrhage occurring just before the menstrual epoch, and found it to control it perfectly.

Dr. Bartholow said the use of sulphuric acid and its compounds was of interest in this connection. Had seen a lady with uterine fibroid, and who suffered from metrorrhagia, greatly relieved by the administration of diluted sulphuric acid, given by a homœopathic physician after various other remedies had been tried without success. Thought the beneficial effects of sulphate of magnesia in hemorrhages depended on the acid it contains.

Dr. Wright said he had often succeeded with the epsom salts after failing entirely with the acids. Thought the sulphate of magnesia must possess some peculiar efficacy in these cases. Many years ago, during an epidemic of scarlatina, a physician, a friend of his, had met with great success in this disease, and his treatment consisted in the use of epsom salts in small doses, and the external application of cold water. Especially in cases attended with hemorrhage was his success marked.

Dr. Bartholow said that the sulphate of magnesia, with the addition of diluted sulphuric acid, surpassed all other remedies in the treatment of dysentery, especially when there is much blood in the discharges.—*Monthly Abstract of Medical Science.*

LOCAL TREATMENT OF CANCER.—Dr. J. E. Nichols recommends, in the *Chicago Medical Journal*, the more frequent use of local applications in cancer. We quote one case to show his treatment:

Case 1. Mrs. J. B., aged fifty years, sent for me December 10th, 1873. Has been scrofulous and an invalid several years. No cancer in her family. For several months a small, hard, painful tumor has been coming on the gums of incisor teeth and roof of the mouth, obviously caused by wearing false teeth on an illy fitting rubber plate. Some five weeks before, a little-pill fellow had bunglingly endeavored to extirpate it with a pair of scissors and table fork. It had grown very rapidly from the time of that mutilation, and was now as large as a walnut. Diagnosed it to be an epithelial cancer. Treatment:

℞.—Chloride of zinc,
Pulv. bloodroot, āā q. s.

Rub together in open air till it forms a stiff mass or paste. Put enough on cotton-wool to cover the entire surface of the cancer, wedge more cotton-wool between it and the upper lip, tell her to avoid allowing the saliva to come in contact with it as much as possible, and instruct her to remove it and have the paste wiped entirely out of the mouth when she has had it there long enough to become tired.

December 11th. Patient has left the paste in position about two hours, and on examination I found a thin white eschar over the entire surface of tumor, and detached and loose in places. Pocketed some paste under the loose parts of eschar, and applied more on the surface as before. I returned in about two hours and removed it myself.

I repeated this process for ten days, each day removing detached parts of the eschar, and applying fresh paste, both by pocketing it under loose parts of the eschar and on cotton-wool. At the end of this time the wound presented that freedom from cancerous particles that one soon learns to recognize in using this paste. The applications were quite painful at times, but not dreaded as would have been the knife.—*Medical and Surgical Reporter.*

SUBLINGUAL MUCOUS CYST.—A woman, thirty years of age, presented herself at the hospital with a large, soft tumor under the left side of the tongue. It had been noticed only five weeks, although it was two inches in diameter, and crowded the tongue upwards and to the opposite side. It was painless, but very troublesome on account of its size. The voice and deglutition were considerably affected. Dr. Homans punctured the tumor and found the contents to be a clear, glairy fluid, like that usually found in mucous cysts. A portion of the walls of the growth was excised.

These tumors, sometimes called ranulæ, were formerly supposed to be due to obstruction of the salivary ducts. They never contain saliva, but mucus, and are due to an obstruction of the mucous ducts and glands in the floor of the mouth. It does no good simply to open these cysts, as they are pretty sure to refill sooner or later; but some irritating application should be made to the interior, such as tincture of iodine. A seton is sometimes sufficient for the cure of a small cyst, but the best treatment is undoubtedly the one above mentioned, by removing a portion of the walls of the growth.—*Boston City Hospital Reports, in Boston Medical and Surgical Journal.*

TO FILL TEETH WITHOUT PAIN.—This is the use of aconite to which I now wish to direct the attention of physicians and dentists. To me it is a new idea. Is it practicable? Years since I was familiar with current dental literature, but not now; and perhaps I am suggesting something which may be familiar to others and which may form an item of instruction in dental colleges. I have no doubt that the tincture of aconite root would temporarily so benumb sensitive dentine that it might be excavated without pain, but this I do not know from actual experience. But that it will benumb an exposed nerve while we apply escharotic agents, I seem to have determined in a recent case. In my early life, as a country physician, I devoted a portion of my time to dental operations, and so a very few family friends still insist that I shall "fill this tooth." And a few days since, in excavating a cavity on the articulating surface of a small molar, my drill reached the pulp. The opening was quite small and at the side, rather than upon the end of the nerve cavity. The pulp bled freely, and I lightly filled the excavation with cotton. There was but little pain for two days, but the cotton could not be even slightly pressed upon without the darting stab of pain. The cotton was then removed with the intention of destroying the nerve with acetate of morphia and arsenic; but this is commonly so painful that it occurred to me to first *anæsthetize the nerve with aconite.* Cotton, saturated with the tincture, was placed in the excavation. It produced only slight and momentary pain, and in fifteen minutes it was removed. Another pledget, wet in the tincture and well covered with the morphine and arsenic, was now introduced. It remained in the cavity three hours, but produced no pain. It was then taken out, and as all discolored dentine had been previously removed, I decided to fill with gold, at once, without extirpating the nerve itself, or interfering further than unavoidable with the nerve cavity. It was plugged, the pressure upon the pellets not being made at first directly in the line towards the opening to the pulp; but afterwards placed as solidly in every direction as serrate pointed instruments could be made to pack it. There has since been no pain or other evidence of inflammation. This is only one case, but it seems entirely successful. The structure near the nerve was so hard and clear, that I presume the nerve itself was not diseased at the time the excavation was made. I know not whether that nerve is now dead or alive, but it is unquestionable that intense pain would have been produced by the escharotic had not the aconite been applied before it, or along with it, or both.

May we not thus destroy any dental nerve without pain? If so, these suggestions may be instructive to physicians, may be of great value to the dentist, and may save immense suffering to those who have such teeth to be filled.

This suggests that other surgical operations, occupying only a small extent of tissue, may, perhaps, be rendered painless by a similar application. If so, aconite may be an agent of much value in developing painless surgery, both in the use of the knife upon limited portions of superficial tissues, and in the use of the escharotics to destroy morbid growths.—*Paul W. Allen, M.D., in Medical Mirror.*

Notes on Celluloid.—The comparative perfection to which this base for artificial teeth has been brought is a matter of congratulation on the part of those of the dental profession who have been looking to it as a relief from the vulcanite monopoly, or in the expectation of finding in it something intrinsically better than the rubber plates lately so universally made and worn. The beauty of the material, its elegant appearance, its near approach to a gum color, are really advantages so great as to tempt one to overlook any defects that may have been found in its working qualities or in its durability. The former difficulty, it would seem, has been pretty effectually overcome, and the latter, it is hoped, will be found by the grand test of time to be at least equal to the substance it is the rival of—vulcanite. It is worth while to say in passing, that the durability of vulcanite plates seems to have been over-estimated by many, and that a fair average of their life is not probably over five or six years. While a few do last much longer, yet the large majority of the plates that are made soon break down.

The advantages of celluloid over vulcanite, so far as regards the question of mercurial poisoning, are manifest, and need not be more than adverted to. Whether our friends, the homœopaths, will be able to make cases of camphor-poisoning out of it, remains to be seen.

Possibly some better solvent, and one in which the solvent itself may enter more solidly into a combination with the cellulose, may yet be found,—one possessing the properties of ether, without its objectionable qualities. That we are only on the threshold of discoveries in this field seems highly probable.

It is not likely that the best method of working this substance has yet been evolved, for, like all things else, these matters seem to grow slowly, and our knowledge and wisdom do not always go hand in hand. With regard to the preparation of the mould, if the method devised by

Dr. McClelland, as applied by him to rose pearl, which is only another form of celluloid, were rid of its undesirable features, it would possess advantages over the plaster moulds in ordinary use, until at least good dental plaster becomes the rule and not the exception; for with these metallic moulds a smoothness and finish can be given to the plate which leaves nothing to be done on removing it from the press except to cut away the surplus and polish the edges thus cut. Plaster moulds, however, may, with sufficient care, be made so smooth as to require no finishing, as the celluloid does not sink into the surface of the plaster, as does vulcanite. In cases lately constructed by the writer, the finish of the piece as it came from the flask could not well be improved; plain teeth being used and the wax surface smoothed with the blowpipe. The gum color was sufficiently good to answer the purpose, and the fact that plain teeth are used allows an artistic arrangement rarely attempted and not often practicable with block gum sections.

The best apparatus for softening the plate and closing the flask is probably yet to be constructed, but of those so far made all seem in careful hands to produce good results. Few, however, would willingly adhere to the "oil" method, which we believe was the first practiced, with its suggestions of "lard rendering" all over the house, if a more pleasant and equally efficacious plan were presented; and fortunately in celluloid we have quite a variety of methods from which to choose. Glycerin or steam are better than oil in the sense of being more pleasant and agreeable, and the dry process as worked in several different forms is still better in not having any liquids to handle, and in not incurring (as in the steam apparatus, at least) the supicion of a risk of an explosion.

Several forms of the "dry process" are referred to above. One only, so far as is known, is patented,—that of Dr. R. F. Hunt, of Washington, D. C., which consists of a simple brass oven, large enough to receive the flask, with its screw clamp, and a cover so constructed as to form part of the clamp, and fitting tightly the top of the oven; suitable heating apparatus, a gas jet, alcohol or other lamp being placed under the oven. No thermometer or instrument for registering the temperature is attached, reliance being had on the judgment of the operator, who removes the flask from time to time and tests its temperature by trying the screw and by touching the hot flask with a damp finger, just as the laundress judges of the temperature of her smoothing irons, the "sizzle" indicating the amount of heat present.

Really, while to the careless and unthoughtful, special forms of apparatus and special guards against accident are necessary, with those who are disposed to keep their work well in hand and execute each step thoughtfully and with eyes wide open to results, no special apparatus need be purchased save the flask and screw-clamp. The oven of the kitchen stove or any place where air of a sufficient temperature to soften the plate can be had will answer perfectly well. We have lately had excellent results from closing the flask in a large copper ladle, formerly used to melt lead in, the ladle being set on the gas stove and the heat thus applied. True, in this case considerable heat is lost, which in a better constructed apparatus could be economized.

Some, we understand, are using the oil apparatus, minus the oil, with excellent results, an improvement on its original use. No thermometer is used, and indeed it is questionable if this instrument is of much value, for if the operator is present and can see the thermometer, he will be in all probability from time to time trying the screw to see if the plate is soft,—a sufficient guide it would seem. And then too, judging from the fact that of two thermometers possessed by the writer, made to be used with this sort of apparatus, on being immersed in a hot oil bath, the mercury in one stood thirty-five degrees above the other, the conclusion would be reached that the simple test is as accurate as the more scientific.

Something remains to be said regarding the welding properties of celluloid, and some of its peculiarities, which are deferred until some experiments in progress and in contemplation are completed.—*Prof. J. B. Hodgkin, in American Journal of Dental Science.*

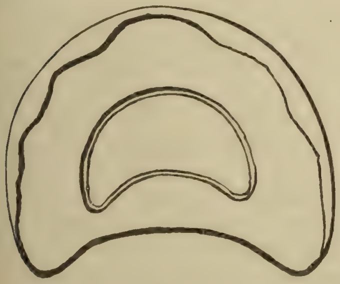
Improvement in Dental Plates.—Specification of D. M. Lamb, London, Canada, forming part of letters patent No 159,687, dated February 9th, 1875; application filed November 17th, 1874.

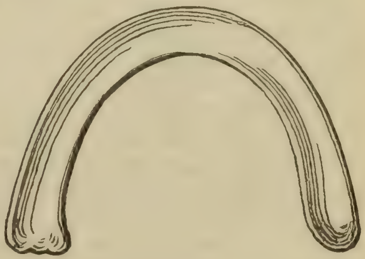
To all whom it may concern:

Be it known that I, Daniel Martin Lamb, of London, in the Province of Ontario, Canada, have invented a new and useful Improvement in Dental Plates, of which the following is a specification:

The subject of my invention is a dental plate made from the vulcanized inspissated juice of plants of the asclepias or milkweed family, either alone or in combination with ordinary caoutchouc or India-rubber.

The accompanying drawings represent upper and lower dental plates of common form, to either of which my invention is applicable.





In carrying out my invention I employ processes set forth in letters patent Nos. 140,281, 140,282, 144,622, and 144,623, heretofore granted to me, or either of them, as may be necessary.

The vulcanized gum from the milkweed juice having been produced in its green state, either with or without admixture of India-rubber, it is properly moulded and vulcanized to produce a dental plate in a manner similar to that which is now practiced with ordinary rubber.

I am aware that dental plates have before been constructed of vulcanite produced from other materials. This therefore I do not claim.

My improved dental plates constructed of the vulcanized inspissated juice of milkweed are found to possess peculiar characteristics, which distinguish them from rubber vulcanite dental plates, and give to my invention great practical value. My improved vulcanite is of a cool character, rendering it more agreeable as well as more healthful in use. It is entirely tasteless in the mouth, and when properly prepared and cleansed of its solvent, it is entirely inodorous. It is not liable to be acted upon chemically by the saliva.

The invention thus removes a serious and in many cases fatal difficulty in the use of rubber vulcanite dental plates, especially with patients who are or have been required to use mercury in any form. My improved vulcanite is also harder and stronger than that in common use, and it can readily be furnished at one-fourth of the cost, which removes all temptation to or liability of adulteration.

It is used with good effect either alone *or in combination with twenty or twenty-five per cent. of ordinary rubber vulcanite.*

Another great advantage in my improved vulcanite in its application to dental plates consists in its capacity to bear a much higher degree of heat than India-rubber, so that it is not liable to destruction in the treatment which is necessary to complete vulcanization.

I claim as new and of my invention—

A dental plate constructed of the inspissated juice of milkweed, vulcanized either alone *or in combination with India-rubber or other vulcanizable gum.*

Management of the Dental Nerves.—I entirely indorse the opinions expressed by Mr. W. Donald Napier relative to the desirability of preserving the "nerves" of the teeth. After an experience like his of twenty years' careful observation, I hold that the destruction of the "nerve" is not attended by such success as would warrant an indiscriminate persistence in its practice, and I think that those who hold views opposed to that practice have reason on their side to support them.

Consider what it is that some so ruthlessly destroy; the so-called "nerve" is the remaining unossified portion of the tooth germ, whose dentigerous functions are only in abeyance,—only waiting favorable conditions to awake from its dormant state and form new tooth-bone, and this it is that many propose, though irrationally, to destroy. But what is the result in a vast percentage of cases? The tooth so treated becomes a dead member, and local irritation speedily calls for its removal. We will allow that, in a great many cases, this pulp comes before us decomposed and disintegrated, and then it becomes the duty of the dental surgeon to remove those putrescent remains, to restore the cavity to a healthy state, and to put the tooth into as favorable a condition for preservation as its wrecked circumstances will permit, and the chances are that it may be serviceable for a time; but the simple exposure of a pulp should never be followed by its unscientific destruction, for it is the center of a tooth's vitality, and, by rational treatment, may be retained for years as a sound and useful organ.—*T. Charters White, in British Medical Journal.*

Application of Rubber Dam.—The proper adjustment of the rubber dam being sometimes a difficult matter, I submit this description of the method I followed in a recent case, with the hope that it may prove of interest to a few, at least, of the profession. The case to which I refer was the filling of an upper second molar of the right side of the jaw, decayed on its posterior proximal and grinding surface below the margin of the gum. After several ineffectual attempts at placing the dam so as to secure the cavity from moisture, I hit upon the following expedient, which was entirely successful: taking a piece of dam and cutting a hole in it after the usual manner, I threaded a needle with ligature and drew the ligature twice through the dam at the distance, below the lower edge of the hole already made, occupied by an ordinary separation. This afforded the advantage of carrying the dam as far as was desired, and furnished an ample margin for pressing the dam under the gum, thereby keeping the cavity to be filled perfectly dry.—*Nicholas C. Stark, in Missouri Dental Journal.*

MUCILAGE FOR MINERALS, ETC.—Geological Museum, Princeton, N. J., April 19th, 1875. My friend, Prof. R. P. Whitfield, Palæontologist, of Albany, N. Y., was good enough to give me the following recipe for mucilage to mend fossils and minerals, and, after several months of experience with it in the Museum, I find it so valuable that, with his permission, I send it for the benefit of the readers of your journal:

Take of starch, ʒii;
white sugar, ℥i;
gum arabic, ℥ii;
water enough.
Dissolve the gum, add sugar, and boil *until the starch is cooked.*

Prof. Whitfield is in the habit of drying it into sheets, on paper, and redissolving when wanted. He does not claim to have originated the recipe; but thinks it is one of the compositions offered to the United States Government for gumming stamps.

It is certainly a very adhesive mucilage, and, owing to the sugar, never becomes brittle; so that it never scales off, as most glues do, from stones or other hard substances. In a geological cabinet it is simply invaluable.—*Franklin C. Hill, Ph. G., in American Journal of Pharmacy.*

FACIAL NEURALGIA.—Mr. Henry Sewill related three cases of facial neuralgia, which, after resisting treatment for considerable periods of time, were cured by the extraction of carious teeth with inflamed nerves. The patients had not suffered from toothache. Dr. Broadbent remarked that in his experience several cases of the most severe facial neuralgia, in which diseased teeth were not suspected by the patient, had been permanently relieved by dental treatment.—*Harveian Society Reports, in British Medical Journal.*

AMAUROSIS FROM A CARIOUS TOOTH.—Dr. P. Lardier records a case of amaurosis in the right eye of a boy eight years of age, who also had chronic conjunctivitis. On investigating the case, Dr. Lardier was finally led to suspect these troubles to be the result of an extensive caries of the first upper molar on the right side. He accordingly extracted the tooth, which was followed with restoration of sight, and under proper treatment the conjunctivitis was afterwards cured.—*L'Union Médicale.*

MODE OF DEATH FROM INHALING NITROUS OXIDE.—M. Magitot asserts that the mechanism of death is very different from the employment of nitrous oxide, and from other anæsthetics, as ether and chloroform. When it results from the administration of the two latter, it is by syncope, but when from nitrous oxide, it is by pure and simple asphyxia.—*L'Union Médicale*, 16 March, 1875.

M. Darin, at a meeting of the Société de Chirurgie on March 3d, read a paper in which he denied that nitrous oxide acted by producing asphyxia. This gave rise to discussion, and the following conclusions were adopted: 1. That nitrous oxide does act by inducing asphyxia. 2. That ether has been too much neglected in Paris, and that it would be desirable to return to its employment.—*Medical News and Library.*

A CONVENIENT LOCAL ANODYNE.—Take of elastic collodion, one ounce; hydrochlorate of morphia, fifteen grains. Dissolve the morphine salt in the collodion. Spread with a camel-hair brush some of this solution on the painful part, and place some oiled silk over the spot. The effect is stated to be most satisfactory.—*London Lancet.*

TEETH AND OATMEAL.—It has long been noted in this country that in those districts where the use of oatmeal (in place of wheaten flour) prevails, we find children and adults with the best developed teeth and jaws; and so well recognized is the influence of oatmeal diet upon the teeth, that many practitioners order its use as an article of daily diet for children, in cases where the dentition seems likely to be either retarded or imperfect.—*Dr. Coles, in London Medical Record.*

MANUFACTURE OF NITROUS OXIDE.—A circular of the Royal Danish Board of Health (June, 1873) provides, that: 1st. Nitrous oxide gas must be dispensed from pharmacies only, on requisition (prescription) of an authorized physician or dentist. 2d. The reservoir must be sealed and labeled, "Nitrous oxide gas."

It does not expect every apothecary to prepare said gas, but requires the manufacturers to see that: 1st. The nitrate of ammonia does not contain chlorine, sulphuric acid, nor nitrate of potassa. 2d. That the nitrous oxide gas passes through water, a solution of protosulphate of iron, and a solution of potassa or soda. 3d. The gas must not be dispensed, unless it has been in contact with water for at least twenty-four hours.—*American Journal of Pharmacy.*

ETHER *vs.* CHLOROFORM.—Very tardily, but at last, the profession in Great Britain are beginning to discover their almost criminal error in the persistent use of chloroform as an anæsthetic, a custom which was imposed upon them by the authority of Sir James Simpson, and notwithstanding the mortality which it yearly caused, and the demonstration both in this country and France of the innocuousness of ether.

In an editorial entitled Ether *vs.* Chloroform which appears in the *Lancet* for January 30th, 1875, we find an earnest advocacy of the use of ether which concludes as follows:

We should hesitate to admit with the Americans that ether is absolutely safe; but we are prepared to believe that any small dangers which may attend upon it are under the control of vigilance and good management. With regard to chloroform the same cannot be said; and, as long as its employment is continued, it will continue to claim its occasional victims. It is surely incumbent upon every surgeon to guard the life of his patients, and to keep himself in the right, by the systematic employment of the anæsthetic which, so far as knowledge now extends, is at once as effectual as any other and more safe.—*Medical News and Librarg.*

SUCCESSFUL LAWSUIT OF AN AMERICAN DENTIST.—In the Court of Record the case of Peacock *v.* Harrison was heard. This was a very curious case, in which the plaintiff, Mr. Charles James Peacock, dentist, Scarbro', claimed the sum of £4 4*s*. from the defendant, Mr. J. W. Harrison, timber merchant, Cottingham, near Hull, for filling one of his daughter's teeth, and operating on another tooth, the operations lasting four and a half hours, in October, 1873. Mr. Warner Sleigh and Mr. Haigh were for the plaintiff, and Mr. J. Smith was for the defendant. Miss Harrison, it appears, was attending a young ladies' school in Scarbro', and by the advice of the mistress consulted Mr. Peacock about her teeth. It was objected for the defense that the charge was excessive, and a guinea had been paid into court. Mr. Sleigh, in the course of a long and eloquent address, pointed out that his client was a properly qualified man; that he held a diploma of the Pennsylvania College of Dental Surgery; that his regular charge, as well known in Scarbro', was a guinea per hour; that he had spent four hours and a half on defendant's daughter's teeth; and that he had brought the case into court purely on principle, in order to vindicate his professional reputation, feeling that to take any less than the specified fee would be derogatory to his profession. Several witnesses were called, including Dr. Coffin, of London; and several local surgeons supported the plaintiff in his charge of four guineas as reasonable, and stated that he was a practitioner of great repute. For the defense it was contended that one or two guineas at most would have been a reasonable charge, especially as in this instance part of the stuffing had come out. The jury returned a verdict for the plaintiff for the full amount claimed, and the Recorder allowed costs on the ordinary scale of the court.—*English Newspaper.*

HINTS AND QUERIES.

Will some experienced worker of celluloid please state whether it is absolutely necessary to leave the case under pressure five hours?

It is sometimes very desirable to finish up a plate in two or three hours after commencing. By immersing the apparatus in cold water immediately after closing the flask, could it not be removed with safety in two hours?—W.

In the month of October, 1874, a married lady, aged twenty years, called at my office, to consult in reference to her left canine, which was very loose. Upon examination I found it to be a deciduous tooth, and, upon removal, discovered the point of the permanent canine, which I supposed would soon fall into line and report for duty. But seven months have elapsed and there is apparently no change whatever,—the point is still projecting about one-eighth of an inch above the gum.

Query.—Will it ever come to its proper place? If not, what is best to do with it?—B. G. A.

Reply to W. G. B. in April Dental Cosmos, who asks how to cure pyorrhœa alveolaris:

Use the following:

℞.—Acidi sulphurici, ʒi;
Aquæ destillata, ℥ii;
Sodæ biborat., gr. iv.;

or the officinal aromatic sulphuric acid may be used instead. The mode of application is essential to success in the treatment. The best method to apply the remedy is with two slender excavators and a pledget of cotton (syringing has proven unsatisfactory). After saturating the pledget, force it down between the tooth and its socket, pumping up and down until the parts are "satisfied." Then bathe the gums and teeth with an alkaline wash to neutralize the acid. The next day paint with tincture of iodine. If pus continues to be discharged after ten or twelve days, repeat the operation. It is well to protect the sublingual ducts with a wad of bibulous paper when treating the lower incisors, as an excess of the fluid flowing around underneath the tongue would be liable to produce an eschar. Thorough cleansing of the parts implicated from all extraneous substances is a prerequisite to success. With the treatment thus indicated a radical cure can be relied upon in most cases. Similar treatment cures gingivitis infallibly. If the mixture is not sufficiently strong, its strength may be increased by the addition of more sulphuric acid.

A suggestion of Dr. W. H. Atkinson stimulated the writer to a trial of this treatment, which has resulted satisfactorily in a number of very aggravated cases.

J. T., in the May Dental Cosmos, replying to W. G. B., suggests that we shall hear more of this trouble from the unreasonable use of rubber dam and wedges. The writer has habitually used hickory wedges at the necks of teeth in approximal operations for seventeen years in one community, closely observing the effects, and feels justified in asserting that not the slightest harm has resulted therefrom.—G. P.

Celluloid.—With regard to the working of celluloid, permit me to say that I have not mounted a set of teeth upon any other base since June, 1871, and I would not now work rubber if a present were made me of the right to use it.

I am still using the old oil tank. I have no doubt the new steam apparatus is a much more agreeable method of manipulating the celluloid, but I have no personal experience on this point. I have had the misfortune, when working the rubber base, to crush the artificial gum, an accident which may also happen in working celluloid. I have tried various methods to prevent this result, but the following is the best I have learned:

By combining what is known as river sand with the plaster which is to envelop the teeth, it acts as a support, and holds the teeth and artificial gum in position. I mix the sand in the proportion of about one-third to two-thirds of good plaster, using as little water as possible. Instead of putting salt in the water used to mix the plaster, I use a solution of chloride of zinc. Sand combined with the plaster prevents it from shrinking, and so failing to support the teeth and artificial gum in position. I use castor oil in the tank in preference to all other kinds of oil, believing that it improves the quality of the celluloid. With the use of sand, as above, and with proper care, there is no need to resort to plain teeth for fear of crushing the artificial gum. I use sheet-lead, obtained from tea-boxes, to secure a uniform thickness of the plate.—P. H. Cardwell.

Those who have experienced difficulty in keeping the hands clean from laboratory stains, from vulcanizing flasks, *wax and gutta-percha*, varnish, etc., will find it to their advantage to use *spirits of turpentine*. It will remove all this dirt instantaneously, and leave the hands soft and white. A little cologne will remove all of the odor of the turpentine. Put a little in the palm of the hand and rub over the surface.—F. E. Howard.

THE

DENTAL COSMOS.

VOL. XVII. PHILADELPHIA, AUGUST, 1875. No. 8.

ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the Office of the Librarian of Congress at Washington.]

(Continued from page 341.)

WE are thus brought to the discussion of a question which has for a long time quite agitated the dental profession; and it is certainly one which is worthy of critical investigation. This is the advisability or non-advisability of leaving other than perfectly healthy dentine in cavities of decay.

In excavating cavities of deep-seated decay which belong to my *first* class and consequently contain soft, white, pulpy dentine, there is little to consider in this matter, for the resisting power of tissue in such cases is generally of very low order, and the gradual, and frequently almost painless, death of the dental pulp is quite sure to be the sequence of a close approximation of disease to it; nevertheless, it is advisable, particularly in a *young* tooth, to make every effort towards conservation of its *complete vitality*, and for this purpose the life of the pulp is essential.

In the routine of practice it is here that the free use of creasote is advocated, the advisability of its employment being based upon its known antiseptic power,—but I wish at this time to protest against the wholesale use of this medicine indulged in by the dental profession.

From the manner in which it is too frequently employed, it seems to be regarded as a "panacea;" whereas it is oftentimes the *cause* of all the trouble which is *ascribed* to that familiar agency, "disease."

Creasote is an irritant, a powerful irritant, and yet it is used where soothing influences are eminently indicated; it is an antiseptic, so antiseptic as to produce by its phenate of albumen an insoluble compound which precludes all further *nutritive* action,—and yet it is used to *satu-*

rate tissues which it is desirable should be restored, through nutrition, to a healthy condition. It is an escharotic, producing by its application that eschar which has to be removed as a dead, and consequently foreign material,—and yet it is forced, repeatedly, into positions about teeth where death has already too much sway, and where, on the contrary, every effort should be made to aid vitality in its seemingly already unequal contest.

I make these statements, that the almost entire omission of this medicament may be additionally noticeable in my remarks upon the *treatment* of dental disease. During my courses of lectures, I embraced every proper opportunity to counsel against its unnecessary use, and in my clinics I satisfactorily demonstrated the *advantage* of its abandonment; and I have found that each successive year of practice has only confirmed my previous experience.

For many years dentistry has left uncorrected the popular fallacy that creasote was the remedy for *all kinds* of toothache, and has also left upon the popular mind the additional fallacy that this remedy was very injurious to teeth, causing them to decay with great rapidity.

It seems to me that systematic effort should be made to put away such errors as are capable of demonstration, that thus the professional and popular mind may be alike in better condition for progress; and of these errors no one is, probably, more generally accepted as a truth than that creasote is an indispensable article in the practice of dentistry. So far is this from the fact, that I desire to state that a large portion of my practice (other than with my regular patients) is devoted to the saving of teeth that have been abandoned in the various stages of dental trouble; that relief from present suffering is generally promptly afforded; that exemption from pain during treatment and operating is the rule rather than the exception, and that time has demonstrated a permanence of results which compares quite favorably with any accepted method of treatment.

This is accomplished with the *practical exclusion of creasote,* and with such infrequent employment of oily carbolic acid (almost odorless) as is associated with sensitive dentine (rarely), or arsenical applications (in cavities *between* teeth), or for an *occasional* moistening of cotton for canal filling.

By this modification of practice, there is gained not only the absence of that odor, taste, and burn which is so disagreeable to so many patients, but my conviction is that convalescence is hastened, and sometimes success, instead of failure, attained from its non-employment; therefore, for many of the conditions in which creasote or carbolic acid are usually regarded as indicated, I think I *advantageously* substitute the *oil of cloves;* while for some others it will be found that I attribute increased success to using *no medicine.*

I have said that in deep-seated decay of soft, white teeth, there can be but little discussion as regards leaving partially disintegrated dentine in cavities from which its removal would expose or nearly expose the dental pulp.

The reason for this is the peculiar character of the caries; leaving, as it does, in its rapid progress a tissue so broken down as to preclude the probability of recuperation, it seems unreasonable to suppose that benefit should accrue from its presence between the pulp and the filling material.

We have, therefore, to regard—*first*, its careful removal, so as to preclude undue approach to pulp-cavity; *second*, the application of remedies for neutralizing such conditions as militate with the probabilities of future comfort; *third*, considerations pertaining to the filling itself; and *fourth*, considerations pertaining to the introduction of the filling.

1*st*. It has been my custom in lectures to urge from the beginning the necessity for study in the direction of the minute anatomy of the teeth; for, although remarks upon the pulp-cavities seem to be most in order when we come to consider the treatment proper of the pulp, it nevertheless is quite as important (if, indeed, it is not *more* important) that as thorough knowledge of their location should be possessed *in order to avoid them*, as is considered needful for their proper preparation under greater complications.

I feel, therefore, that I cannot too strongly insist upon the advantage which is gained from a close and persistent examination of the peculiarities possessed by the pulp-cavities of the various teeth. I feel the more that I must say this much now, because of the fact that this purely anatomical material must, of necessity, enter as infrequently as possible into considerations avowedly pathological, and because I desire to refer quite minutely to this subject when we shall have reached "exposure of the pulp."

Knowledge of these peculiarities of pulp-cavities is, then, the foundation upon which is based all care in removal of decay so as to preclude undue approach to pulps.

2*d* The application of remedies for neutralizing such conditions as militate with the probabilities of future comfort.

In teeth of this kind, the great obstacle to success seems to be an inability for recuperative effort upon the part of the pulp.

The dentine disintegrates readily and breaks down rapidly; the enamel whitens, softens, and crumbles; all attempts at conservation or stimulation fail sooner or later, while neutralizing injurious agencies and supporting weak tissues seems to be the only course to pursue.

The general reddening of litmus paper by the contents of these cavities is sufficient indication to warrant an antacid application as the first means of preventing the further softening of dentine. For this purpose I usually employ prepared chalk,—the lump form being more easily manipulated than the pulverized,—or bicarbonate of soda, or solution of ammonia; these are all efficacious and not liable to irritate the pulp, while the intensity of the redness or the relative density of the tissue is the indicator of the weaker or the stronger applications,—the softer the tissue the milder the application. After neutralizing acidity, if any pain supervenes it should be allayed by an application of oil of cloves; but if there be no pain, it becomes,

3d, a question as to filling material.

These are the teeth in which gold fillings usually fail in from one to three or four years, *except in cavities upon the articulating faces.* These are, therefore, the teeth in which I advocate the introduction of gutta-percha as a filling material between teeth and upon the buccal faces; but it is in deep cavities of such teeth that I would advise a lining of gutta-percha, covering that portion of the cavity nearest the pulp, even if the bulk of the filling be of some other material, gold, tin, or amalgam.

4th. If the cavity be dried perfectly, and a truly adhesive union be made of the warm gutta-percha with the dentine, it will be found to be the most permanent protection possible to introduce,—maintaining intact all tissues covered by it, even after crevicing has taken place around the outside filling to the extent of rendering it worthless.

I have already referred to the danger of pulp-irritation which exists in connection with some of the applications for the relief of sensitive dentine. This is the case with cavities of ordinary depth, and is much increased with every nearer approach to the pulp, and it is, therefore, most prudent always to attain the possibility of placing a good gutta-percha protection for the pulp before finally preparing for filling the more external portions of these cavities. By adopting this method much risk is averted, and, as a rule, much more satisfactory excavations and edge preparations are attained than when all complications have to be thought of, and guarded against, under one operation. Besides the danger of excavating too close to the pulp and thus irritating that organ mechanically, there is the danger of excavating too deeply and yet not so much as to excite any immediate warning.

It is well known to operators of even limited experience, that occasionally teeth will return to them, giving so much trouble as to necessitate the removal of fillings of comparatively recent introduction. Under these, fair exposures of pulps are found to exist, when careful examination disclosed no exposure at the time of filling. This is due to the fact that too delicate a layer of dentine was left covering the pulp; that the process of nutrition could not be successfully performed in so limited an amount of tissue, and that atrophy has been the result. With this wasting of tissue, perforation has occurred, thus placing the pulp in condition of actual exposure, and leaving a mass of dead and decomposed dentine in contact with it, acting as a mechanico-vital irritant. A third danger which may accrue as the result of excavation, is the absence of sufficient resisting dentine to preclude undue pressure of filling material upon the pulp.

There are three accepted methods of overcoming this difficulty, each of which has produced so many successful results as to entitle it to our respectful consideration.

I. That methodic introduction of either gold or tin foil, which shall insure adaptation of the first portions without that degree of consolidation which shall produce pressure, and which shall permit of gradually increasing consolidation until that degree shall have been attained in the exterior of the filling which will insure a permanently useful result. This is an operation which requires both skill and judgment of no ordinary quality,—but that it can be performed, many years of comfort have attested in very many critical cases.

II. The method of introducing foil by "lateral pressure."

This operation consists of impacting foil by hard, steady pressure against the sides of the lower portion of the cavity, gradually approaching the center with a solid layer of foil, which, constructed upon the principle of the arch, will permit thorough consolidation without danger of direct pressure upon the thin wall of dentine beneath.

It is claimed for this that more thorough consolidation of the filling, as a whole, is attainable, but it is questionable as to whether the gain in this direction is not more than counterbalanced by the possibility of irritation of the pulp by "conduction." When, however, this has been precluded, the value of this method is unquestionable.

(To be continued.)

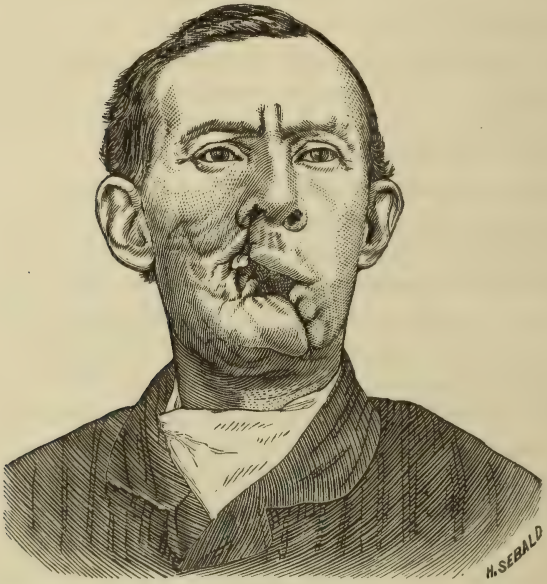
A CASE OF ORAL SURGERY.

BY J. H. M'QUILLEN, M.D., D.D.S.,
PROFESSOR OF PHYSIOLOGY IN PHILADELPHIA DENTAL COLLEGE.

(Read before the Pennsylvania State Dental Society, July 13th, 1875.)

DURING the late civil war, the following interesting surgical case which came under my care was seen during the course of treatment by several professional friends; among them, Profs. D. Hayes Agnew, Jas. E. Garretson, and J. Foster Flagg. I have frequently been urged to publish a report of the case, but have not found it convenient to do so until the present time. John McGouisk, aged forty-two, a native of Ireland, drafted into the 83d Regiment Pennsylvania Volunteers, was wounded at the battle of Cold Harbor, Wilderness of Virginia, June 2d, 1864, by the explosion of a shell. A fragment of the shell struck him in the face, inflicting a wound of great severity and attended by profuse hemorrhage. On being carried to the rear, the surgeon said that he could only live an hour and a half. This prediction, however, was not verified, as he was sent from the field hospital to Alexandria, and then to McClellan U. S. A. Hospital in Philadelphia, where he first came under my notice. I did not see him until some six weeks after he had been wounded, when I was requested by Dr. H. B Buehler, in whose ward he was, to visit him at the hospital. At that time he was in a very critical condition. The wound had healed, leaving a V-shaped fissure in the upper lip (Fig. 1), extending into the right anterior nares. A portion of the lower lip had been lost, and what was left had fallen in and become adherent to the jaw. The incisors, canines, bicuspids, and their alveolar processes in the upper and lower maxillæ had been carried away by the fragment of shell, leaving also a compound fracture of the lower jaw. The under surface of the tongue, from the tip, had become adherent to the lower jaw, while the fractured ends of the maxilla were drawn towards each other by the contraction of the mylo-hyoid muscle. The pressure of the lower molar teeth on the sides of the tongue produced constant irritation of that organ, which was very much swollen, so much so as to interfere with respiration. It was with great difficulty that the patient could swallow, being restricted to soft food. He could not articulate a word, and was compelled to make known his wants by writing on a slate. At the same time saliva mixed with mucus and pus was constantly trickling from his mouth on to the breast, soiling his clothes, and making him not only unsightly but exceedingly offensive, on account of the unpleasant odor.

Fig. 1.

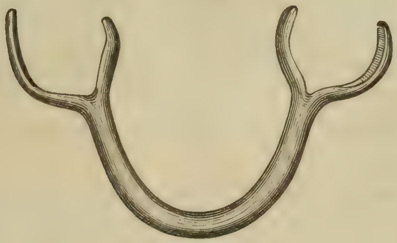


Under his chin there was an abscess of considerable size. Owing to his inability to take the amount of food that the system required, the defective alimentation was attended by a wasted condition of the body. The first indication in regard to treatment on my part was to take the pressure from the tongue by propping apart the fractured ends of the lower jaw. To accomplish this I decided to take an impression of the molar teeth with a piece of softened wax. There was no difficulty in applying the wax to the molar teeth on the right side, but on attempting to remove it I found that it could not be done, on account of a cicatricial band extending from the upper to the lower jaw; restricting the downward movement of the latter.

After two or three ineffectual efforts, I pressed the jaw inward and easily removed the wax. An impression of the molar teeth on the left side was then taken. Having made a plaster model from these, two pieces of half-round silver wire were bent in the shape of a horseshoe and soldered together in the middle, but leaving free extremities that could be applied around the molar teeth in the form of bands, as per accompanying Fig. 2.

The application of this was attended by a sense of great relief to the patient. The pressure upon and irritation of the tongue were thus removed, and, in the course of two or three days, that organ was restored to its normal size, and respiration and deglutition were markedly improved. The patient, who was in the habit of visiting my office every day, suffered considerable annoyance from the mucus, saliva, and pus trickling out of the mouth upon his clothes, and from the abscess under the jaw. In examining the mouth, I discovered a portion of necrosed bone of considerable size, the presence of which was a constant irritation to the soft parts, and maintained a fistulous opening in the mouth and another under the chin. I directed Dr. Buehler's attention to the necrosed bone, and he desired me to remove it and perform any other operations that were needed; placing the patient entirely under my charge. The fistulous opening in the mouth was enlarged with a bistoury, and the necrosed portion easily removed with a pair of forceps. I found that it was a portion of the base of the lower jaw,

FIG. 2.



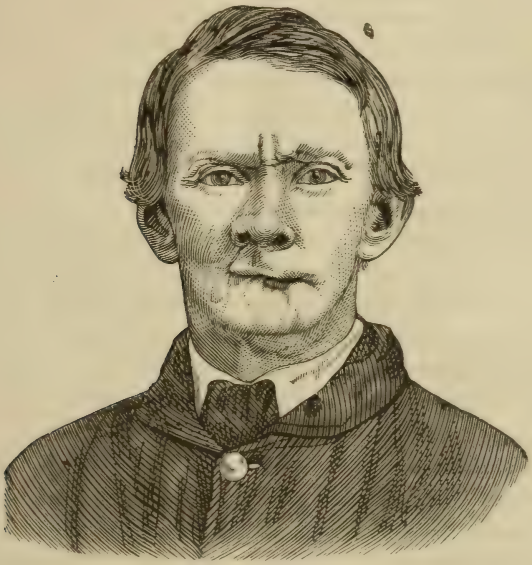
extending from the symphysis to the first molar tooth on the left side. A week after the removal, the abscess entirely disappeared and the oral secretions assumed their normal character, but still flowed out of the mouth At the expiration of this time I proposed to the patient to have the V-shaped fissure in the upper lip closed by a surgical operation. To this he readily assented, and I performed the operation as follows: With a thin bistoury the edges of the V-shaped space were pared away so as to leave a raw surface; two harelip pins were then introduced, and the freshened ends brought and held together by figure-of-eight sutures. The right side of the V-shaped space was formed by a portion of the cicatricial tissue already mentioned, in which the circulation was quite languid, and I was somewhat apprehensive that perfect union of the parts could not be effected; but, on removing the pins two days after the operation, was gratified to find that they had become united. The success attending this prompted me to perform an operation with the view of restoring to the patient his speech, and, if possible, improving the condition of the lower lip. Preparatory to this I removed the remaining teeth in the upper and lower jaws, as they were of no service.

After the gums had healed, I operated upon the tongue and lower lip as follows: An incision an inch and a half in length and an inch in depth was made on the posterior side of the lower jaw, severing the unnatural relation existing between it and the tongue; this liberated that organ, and he was able to protrude the end of the tongue from the mouth. What remained of the lower lip was then carefully dissected up from the lower jaw.

An impression of the lower jaw was taken in wax, with the view of having a hard rubber fixture constructed that could rest upon it, serve as a support to the under lip, and counteract the natural tendency of the part to fall back into its old position; a tendency favored alike by gravitation and the well-known disposition of cicatricial tissue to contract. The wax model was placed in the hands of a mechanical dentist residing in the neighborhood to make the proposed fixture; but, after waiting some time for it, he returned with a spongy mass that could not be used, and I was compelled to proceed without any support. The edges of the lip on each side were attached to the adjacent soft parts by means of metallic sutures. For two days the indications were quite favorable for perfect union, which would have left an opening of somewhat limited size to the oral cavity in comparison with the mouth originally. At the expiration of this time, however, some of the sutures sloughed out, and a portion of the lip was drawn back into its abnormal position.

Although not entirely successful, important results were gained by the operation: the flow of saliva and mucus from the mouth was arrested, and in three or four days he was enabled to speak freely and do entirely without the slate, which had heretofore been indispensable in communicating his thoughts and making known his wants. His appearance was markedly improved (Fig. 3).

FIG. 3.



The patient is now living in Lancaster, Pa., in the enjoyment of excellent health.

THE UNION OF TIN AND GOLD IN FILLING TEETH.

BY N. S. JENKINS, D.D.S., DRESDEN, SAXONY.

IN an article in the January number of the *Dental Miscellany*, by Dr. S. B. Palmer, relating to the "Chemical Action between Materials used for Filling and Tooth Structure," reference is made to the union of tin and gold foil recommended by Dr. F. P. Abbot, of Berlin, to the American Dental Society of Europe, in July, 1874. I wish to add my testimony to the value of the combination suggested by Dr. Abbot.

It is now eight years since he first made me acquainted with his method of using tin and gold in the same filling; and, although I at first accepted it with distrust and experimented with it very cautiously, I long ago reached the conclusion that tin and gold may be united in any proportion in any mouth, not only with perfect safety, but oftentimes with great benefit.

In a German, to a far greater extent than in an American or English practice, the dentist is called upon to treat teeth which are constitutionally so weak as to offer but the slightest resistance to disease. German teeth are frequently found so soft as to present no line of demarkation between normal and abnormal substance, leading the inexperienced operator to continue excavating long after all the decay has been removed, and perhaps inducing him to condemn organs which need only patient and judicious treatment to render most useful. Such teeth I have found to tolerate tin and gold better than any other filling.

In teeth of any structure, where a deep undercut is left after excavating, or where the walls of a cavity are very uneven, no other material packs so easily with lateral pressure. A perfect adaptation to the walls, however jagged and uneven they may be, is readily obtained, and the remainder of the filling can be made with pure gold, if desired, with either mallet- or hand-pressure.

This material is also to be commended for use against the cervical wall of cavities in molars or bicuspids, where the decay extends deeply under the gum, not only because it is so quickly worked, and makes so perfect a joint at the most critical point of the filling, but also because it can be so easily and perfectly shaved down, when finishing the filling, with a sharp sickle-shaped instrument, before removing the rubber dam.

In cavities near the pulp, its comparative insusceptibility to thermal changes is often most valuable. After capping an exposed pulp, it is a commendable precaution to give the cavity a flooring of tin and gold, or tin alone, if circumstances make it advisable, since it is a far less perfect conductor of caloric than gold, and its use may save much inconvenience to the patient and danger to the tooth. A very little experience will enable a good operator to build adhesive gold upon it as easily as upon non-adhesive gold foil.

It may be used either in pellets, cylinders, or ropes; but I prefer laying a sheet of No. 4 non-adhesive gold and tin foil on the foil crimpers and folding them together, with the gold always on the outer side. After being well crimped, the strip is cut into pieces, a trifle more than twice as long as the cavity to be filled is deep. The pellets are then slightly compacted with the pliers and packed with lateral pressure against the walls of the cavity, each piece being doubled upon itself. The extraordinary ductility of the material renders it quite safe to use pellets of such thickness; and, after a little experience with it, much time and suffering can be saved to a sensitive patient. Also as equally durable though not so handsome a filling can be made as with pure gold. Even when the whole filling is made of such pellets, it resists the force of mastication quite as well as if made wholly of gold; but I prefer giving such a filling more of a gold surface. If the gold is on the outside of the pellet, the color remains perfectly good against frail walls, but the surface certainly turns darker upon long exposure to external influences. For this reason it is well to make the surface of the filling largely of gold.

Of course, the most natural suspicion is of possible injury to the pulp through galvanic action. After some months a filling of tin and gold certainly seems to become amalgamated, or at least harder and more firmly united than when first made. This process Dr. Palmer attributes to galvanic action, and I am not prepared to say that it is not the result of electrical force; but I have suspected that it was only another form of the same force which unites atoms of pure gold when the dentist brings them together under proper conditions.

At all events, I feel justified in stating, as the result of my somewhat extended and painstaking experience, that, so far as the pulp is concerned, perceptible galvanic action does not obtain.

It is not claimed that the union of tin and gold is a sovereign panacea, nor that it is applicable to all cases; but in the hands of any skillful and conscientious operator it cannot fail to be often a great boon both to him and to his patient.

ARTIFICIAL CROWNS.

BY H. C. REGISTER, M.D., D.D.S., PHILADELPHIA.

THE following method of placing artificial crowns upon roots in the mouth has of late been practiced by me with much satisfaction. I claim for it simplicity, possible perfect adaptation, ease in manipulation, and reasonable permanency in result.

The usual treatment before pivoting is required here. If the gum be hypertrophied and over the face of the root, cut it away and with a styptic arrest hemorrhage. With dental engine cut down the face of the root in a line with the junction of the enamel and cementum. Thus we get a grooved surface running from the buccal to the palatine side of the root. When the artificial crown is in position this prevents rotation. Force around the root a pledget of cotton saturated with sandarac varnish, and allow to remain until ready to place the crown in position. The cotton will force the gum away and leave the face of root free for manipulation. Place a wooden peg loosely in the canal, allowing it to project, and with the peg in position take a plaster impression. When the impression is removed the peg should come away with it. Make a plaster model, in which the peg should remain to show the direction of the canal.

Adapt to model a plain cross-pin tooth for vulcanite or celluloid backing. If the tooth be too thick to go into position without forcing back the peg projecting from the canal, cut a slot, with edge of disk, deep enough to allow the peg to rest freely between the pins. Back the tooth with rubber or celluloid, forcing the material around the wooden pin.

Finish backing to approximate the contour of crown to be replaced, excepting bicuspid crowns, which I finish the same as the cuspid. Drill the wooden peg out of the backing. We thus get a canal through it corresponding to that of the root, in which with a straight gold screw cut a thread. The crown is now ready to place in position.

Fit firmly into the root a compressed hickory peg, and cut it down with dental engine. Place the crown in position, and, passing a fine drill through the canal, in the backing, drill into the compressed hickory in root. Remove the drill, turn the gold screw through the canal in the backing, cut a thread in the compressed hickory, and screw firmly to place. Over the screw-thread I place a rubber filling.

If necessary, a film of soft rubber may be warmed and placed between the roots. This when the screw is driven home will adapt itself to the parts. All moisture should be carefully excluded during the operation.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

(Concluded from page 372.)

After the report and adoption of suitable resolutions upon the death of Dr. Parmly, and appropriate remarks by several gentlemen, a paper was read entitled, "What may Patients reasonably expect shall be accomplished by Operations upon the Teeth?" by George H. Cushing, D.D.S., of Chicago.*

We give the following extracts from the discussion which followed the reading of Dr. Cushing's paper.

* * * * * * * *

Dr. W. H. Atkinson. The whole matter is in a nut-shell,—a perfectly-developed tooth needs none of our interference; there is just the secret of the whole matter. The imperfectly-developed tooth is liable to go into retrograde metamorphosis. It is liable to go back towards the elements from which it is derived. If we do not understand the principles that underlie our work, we are simply imitators of something we have seen. Now, any tooth that is imperfectly organized is liable to decay under deteriorating influences, whatever they may be. The paper on "Pressure of the Teeth," which would have involved these principles, has not found its way before us. I say that pressure, however conducive it may be to decay in naturally poor teeth, has little effect on well-organized teeth. I plant myself firmly on this rock: if the type of the tooth, be it a simple denticle or a series of denticles that constitutes the single cusps, or a multi-cusp tooth and the other cingules, and all the different compartments of the tooth ; if the type has been answered, there is no need of the dentist further than to teach how to take care of the teeth, and I think the time will come when we shall be consulted solely on that ground. I believe in the development of the teeth according to the law of the evolution of the type that is held within the germ from whence each individual, as a human system, or each individual tooth, or part of a tooth, is derived. So that, if the demand of type is answered, all we are to do is to decide whether that satisfaction of affinities has been attained ; whether there have been disturbing influences present during the progressive evolution of this organ. Every honest man wants every one else to appreciate the God he appreciates ; every honest man thinks he has the truth, and of course all those he loves he desires to come within the same fraternity and correlations. We cannot elevate the profession other than by elevating ourselves. I say I will decline to take charge of a mouth unless I can have the control of it. Upon taking charge of the case, I tell them what I believe respecting it. If it is a matter of belief, if it is a matter of positive knowledge, I put it squarely, I will or will not. I will take charge of this mouth if you will allow me to do what I please. Every tooth, if kept clean, is safe, if not already disorganized. Do not tell your patients that you are so well acquainted with the tooth that you can tell when you have taken out all the unhallowed leaven. Many times have I had reason to regret that I had not cut and saturated with disinfectants more thoroughly towards the cervical walls of the tooth,—especially the superior bicuspids. Many times have I had to patch fillings there.

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* This paper was published in the Dental Cosmos, February, 1875.

In my practice now I will do what I ought to do or nothing, and I am not afraid to take out large fillings altogether. I do hesitate to interfere with those put in by other dentists, because there is an implication of dishonesty in that. I think there is a sin resting upon all our heads, in that we have allowed patients to go off with the idea we were selling gold, for which we made the charge, rather than the professional skill,—unmeasurable in money, when successfully rendered.

Dr. E. J. Dunning. * * * Let me say a few words in reference to the question under discussion. I began my practice with the idea that a tooth once filled was perfectly secure from decay ; but I soon found that with the best I could do, with the best skill I could bring to the operation, the tooth would sometimes decay, and I soon found why it decayed. It was because the portions of the tooth nearest the filling were usually exposed to the same, or nearly the same, conditions that produced the original disease. And these portions not being covered by the protection which nature provides, were more liable to be attacked and injured by such solvents as might come in contact with them than the original surface of untouched enamel. So I found that I was bound in common honesty to say to my patients, as you probably do now, that only by the faithful use of the brush, floss-silk, tape, stick, and other such appliances of cleanliness, in addition to the best that I could do, could they hope for security from the encroachments of disease. So essential have I found this kind of care, that in cases where it was difficult for the patient to learn to apply it skillfully, I have often devoted a part of each sitting to practical instruction in this important art. And let me say to any of the younger members of the profession who may possibly regard such cares and efforts as beneath the sphere of the educated dentist, that whoever is able in such ways to elevate the standard of personal care and physical refinement will, probably, in doing so, help to educate the æsthetic sense, and aid the growth and refinement of the whole nature. He will thus achieve a nobler usefulness, and win in his own consciousness, as well as in the enlarged appreciation of his patient, a more gracious reward. Yet with such teaching, and with the most perfect operations that I could make, I found that teeth would frequently decay after filling. I have, in many cases, been obliged to fight through the years of childhood and youth, frequently changing fillings, until the conditions should become more favorable, but in the end have had the satisfaction of seeing, as the result of my labor, a beautiful and wholesome denture. If other gentlemen have had a different experience, if they have been able to preserve teeth without such care on the part of the patient, and without frequent disappointment from the failure of their operations, they have been able to do more than I have. My reply to the question, "What have our patients a right to expect from our operations?" is, that with great and unremitting care on their own part, under the direction of an intelligent and skillful dentist, and with good health, they have a right to expect to retain their teeth to a good old age.

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Prof. Geo. T. Moffatt, M.D., D.M.D., of Boston, then read a paper upon "Dental Eclecticism," the purport of which is clearly indicated in the title. It was followed by a somewhat desultory discussion which embraced a variety of topics.

Dr. J. W. Clowes. In answer to the question, What have our patients a right to expect from us? I would briefly answer, they have a right to expect the salvation of their teeth; but in connection with that, of course we have a right to expect something of them. I usually place the matter before them in this way: I say, Your teeth can be saved, they are salvable, but it takes two persons to accomplish it. One is the dentist, the other the patient. Now, the question is, what is my part? Gentlemen, there is a terrible failure on the part of our profession in that matter. A patient comes into my office, and I fill every cavity. I make every rough place smooth, and every irregular place regular. Then I say, Take care of your teeth. But suppose I leave the very condition of things in existence that produced the main part of the difficulty. Suppose I leave those teeth all crowded together, how much success have I achieved for my patient? Gentlemen, I tell you the chief cause of disease among teeth is contact. I have announced a number of things in my day that had no support at the time, which at length came to be considered as something important. Contact among human teeth is always dangerous, and its presence a constant source of evil. You must have irritation as a consequence of contact, and it is impossible to save your patient's teeth unless you avoid it.

Question. Will the gentleman state what he would do to relieve that?

Dr. J. W. Clowes. Among the greatest mischief-makers in the human mouth are the sixth-year molars. It is a matter that I have observed for a great many years, and I see abundant evidence of the evils caused by allowing those teeth to remain. Take away those sixth-year molars at about the twelfth or thirteenth year, and there will be relief from that quarter. By that means you will give the wisdom-teeth a chance to come forward. The wisdom-tooth is the strongest of all the molars, and you will find the least number of weak places on its surface.

Dr. E. J. Dunning. I rise, sir, to do honor to the brave Dr. Clowes. I wish to stand shoulder to shoulder with him. I should not have dared to express the opinion on this subject which he has just expressed before you. But, as he has placed himself in the breach and given me the encouragement of his example, I will not desert him in the fight.

With regard to the extraction of the sixth-year molars, I have been satisfied for some years past not to make it a matter of discussion. The current of opinion among the profession in this city has set so strongly in a direction adverse to my own, that it seemed useless to contend with it. I do not believe, sir, that nature placed these molars as temporary teeth, as has been suggested here. But I do believe that in city life, with its lack of physical development, lack of full and vigorous vitality, which alone can produce full nutrition, well-developed jaws, and well-enameled teeth, it is, and will be for many years to come, best to remove them in many of the cases which we are called upon to treat. I believe that this operation alone will be sufficient in many cases, if judiciously performed, to relieve or prevent a crowded or irregular development, and thus obviate a large percentage of disease. I do not know of any other method by which we can secure to patients, whose mouths present these conditions, so much immunity from disease, and consequently from painful operations, as by this. And I do not know of any other way in which we can preserve the most valuable teeth for so long a time; and this is what our treatment should aim to accomplish. But, sir, I should be very sorry to see the necessity for this treatment become universal. I am glad to believe that instead of becoming universal it is really becoming less common, and that causes are in operation that tend to improve the size and healthful development of the jaws and teeth.

So there can be no rule of practice devised which will apply in all cases. I venture to say that there is not among the great number of important questions which the dentist is called upon to decide another of equal importance with this, or which calls for more educated and conscientious discretion. It is a very common error to extract these teeth too early, because it so frequently happens that they become hopelessly decayed and painful before any systematic attention is given to the teeth, often indeed before the dentist is consulted. Let us suppose a case: Here is a child of twelve years of age, in whose mouth decay has begun on the proximal surfaces of all the teeth. All the incisors have begun to decay, and the surfaces of the molars and bicuspids which touch each other are more or less corroded and softened, a condition which we know will result in decay. Now, shall we remove these molars at once? I think it would rarely be best to do so, certainly not in any case in which the second molars are not in their places. In most cases it would be better to submit to the evil of close contact for a time, rather than risk the probable early closing of the spaces left by the molars, and a final return to a crowded condition, which may be worse than the first. I should say, preserve the molars for a few years, even if it should be necessary to destroy their pulps to accomplish it. I think fifteen or sixteen, or even in some cases seventeen, is a better age than earlier for their removal, in order to secure the best permanent results.

Dr. W. W. Sheffield. I was going to ask Dr. Clowes three questions. Dr. Dunning has partially answered one of them. The first is, At what age would he extract the sixth-year molars, and would he do it whether they were decayed or not? Secondly, Whether the present generation does not owe something to the next? Thirdly, If he makes this practice a general one, whether in the coming generation he will not make the difficulty he wishes to obviate worse and worse; and will not such a practice have a tendency to change the type of the jaw?

Dr. W. H. Atkinson. From the days of Abraham down, the Jews have been like other men, and their prepuces are not wanting.

Dr. J. W. Clowes. I want it understood in the first place that I don't mean to extract all sixth-year molars. We are all of us supposed to have some common sense; this thing is to be done according to good judgment, not according to general rule. I think between the ages of twelve and thirteen the proper time to extract them. When I see the twelfth-year molar peeping through the gum, I think the time has arrived to remove the sixth-year molar.

Dr. C. E. Francis. I was much pleased with Dr. Moffatt's paper. I do not see why it is that our profession is so apt to run from one extreme to another. To hear the various discussions in our meetings, it would seem as if one side was arrayed against the other. In my practice of over twenty years—and I have been a close observer of dental operations—I find that those men that have met with the best success are men who are eclectic in their practice.

This question of the sixth-year molars has been a bone of contention for years in our societies; one party would extract them wherever they found them, others would not,—no matter how decayed they were, they would still advocate their salvation.

I have often stated that I considered twenty-eight good teeth, that could be kept for a long period of years, better than thirty-two patched-up ones. I believe in being eclectic and in exercising judgment, and not riding a hobby.

Dr. N. W. Kingsley. It was with some surprise that I heard Dr. Dunning begin his remarks with an apparent indorsement of Dr. Clowes's theory, for Dr. Dunning is one for whose opinion I have such a profound respect that I could not believe it possible that he could adopt an unscientific theory; but my fears were groundless. Dr. Dunning has qualified his indorsement and limits the application of the doctrine. Dr. Clowes said contact is always a cause of decay. Gentlemen must not be misled by this statement. Contact is not *per se* a cause of decay. It is only a coincident favoring circumstance, and in no sense can be regarded as a cause.

According to the Bible, it is now six thousand years since mankind was created. Generation after generation has come and gone, until the aggregate no man can number; so that if all were now on the face of the earth, there would not be room to bury them. Is it possible that all this vast multitude has suffered all the torments of diseased and degenerate teeth, which we have supposed belonged only to modern civilization, and which must certainly have been the case if *contact* is, as Dr. Clowes says, always a cause of decay? Dr. Clowes is mistaken. Contact of the teeth is the normal condition of well-developed jaws and teeth, and is universally found associated with perfectly sound teeth among all peoples not degenerated by luxury or vice. As confirmatory of this I beg to call upon Dr. Nichols, who has spent twelve years among the Indians and Chinese, and has had unusual opportunities in the examinations of the mouths of thousands of both of these races. I would ask Dr. Nichols if he has ever, to any extent, observed decayed teeth among the Indians or Chinese, and if it is not a fact that their teeth are absolutely and universally in contact.

Dr. F. C. Nichols. Certainly, they are in absolute contact. I never have seen approximal decay among the Chinese or Indians.

Dr. J. W. Clowes. I do not want to be absolutely demolished.

I do not say that contact is always the cause, I say it is the harbor in which the enemy finds the security from which he fights and destroys our teeth.

Dr. E. J. Dunning. I rise to an explanation. Dr. Kingsley is perfectly right, and, at the same time, I think Dr. Clowes is perfectly right. There is no issue between them. It is perfectly true that contact is not a necessary cause of decay; and yet, in city life, and under the conditions of inferior development, poor health, and all the conditions that afflict miserable humanity in the city, it is a powerful cause. If the teeth were healthy, if the fluids of the mouth were always as they should be,—slightly alkaline instead of acid,—contact would be a protection; because in the process of mastication, if we lived on such food as we ought, if we chewed the tough cud that Indians chew, or lived upon grain and were obliged to grind it with our teeth, the motion of one tooth against the other would be a continual protection against decay. But living on pastry and miserable sweet things, producing acidity before they have even left the mouth, and producing still greater acidity of the stomach, and when we spend our lives in furnace-heated houses, breathing air from which a certain proportion of oxygen has been removed,—while this condition of things exists, the attrition of the teeth against each other will never be sufficient to remove the difficulties which their close contact and the difficulties of cleansing cause.

Dr. E. A. Bogue. * * * I feel very much like asking gentlemen such as Drs. Dunning, Clowes, and Rich, when they bring these matters up and give us, so positively, the result of their experience, in all sincerity and earnestness, Gentlemen, *how* do you know? Is that experience one that you have drawn upon hap-hazard? Or have you carefully made a record of every case that has passed through your hands, giving the different data necessary to draw correct inferences from each case, and then tabulated the whole thing, and made your deductions from the total results of your experience? When we shall do this more carefully, such a question as the one under discussion will not be answered by the *ex cathedra* dictum,—"Extract all sixth-year molars, for contact is dangerous;" but by the further questions, What is the genealogy, the past and present physical condition of the patient and of the teeth, the habits of life, the habits of mind, the social condition, present and prospective; and from all these data, a matured and reasonable judgment will be formed, based, not upon the guesswork of one man, but upon the carefully collated knowledge of many. * * * *

Dr. Geo. T. Moffatt, of Boston. I thought I might start up a fox in my allusion to the sixth-year molars. That is a question of vital interest to the whole profession. I object most emphatically to the citation of individual cases, as has been done here this morning. They prove nothing. Take a thousand cases where attempts have been made to preserve the sixth-year molars and a thousand cases where they have been extracted judiciously. Then compare the results. It has been my fortune to have a number of patients that had formerly been under the hands of Dr. Dunning. And I am happy to give my assurance of his fulfillment of his desire to preserve the teeth,—preserving more teeth by judicious extraction of the sixth-year molars than if all the teeth were left in and worked shoulder to shoulder on the military plan. I believe, if judiciously done, the extraction of the six-year old molars will save more teeth in middle and advanced life than if attempts are made to preserve those molars. Generally the whole destruction is done to the sixth-year molars before they come under the eye of the dentist. Children of six or eight years of age are brought to us for perhaps the first time, having been previously under the care of the family physician, and it is a notorious fact how culpably ignorant medical men are on the subject of the deciduous teeth and sixth-year molars. The destruction is already complete. The child of seven or eight years of age is brought to you with a sixth-year molar aching with an exposed pulp. What can you do? You don't want to take it out then. You must temporize for the time being, and keep the tooth along until the proper period for extraction.

Dr. W. H. Atkinson. Would you extract one and not the entire four of the six-year old molars?

Dr. G. T. Moffatt. As a rule, I should take out four. At any rate, I should extract the antagonizing teeth, all other things being equal, and perhaps extract on one side and not the other.

Dr. E. J. Dunning. In connection with the gentleman's last remark there were two points that struck me. He was speaking of taking up individual cases as the basis of theories, of proving effects of practice in this matter. We have had one or two mentioned here. It did not occur to me before when speaking to answer them. There are plenty of such cases on both sides. On the one side, extracting those teeth too soon, and the adjoining teeth, as has been represented, come together too quickly, and when they do come together, merely touch their points. It is objectionable, and it would be better to extract the teeth at such a time that they never would come together firmly or strongly. On the other hand, I have seen a case in the opposite practice: patient coming to me almost directly from another dentist, in which the operator had performed a brilliant operation on a six-year old molar; the operation performed, I think, with crystal gold; building up a crown on a sixth-year molar that was very much decayed. He had gone on and performed these operations when all the front teeth were decayed and needing his attention. This is an individual instance. It does not militate against the principle one way or the other. There will be unfortunate results on both sides.

A lady came to me with a child on one occasion, and I thought it best to extract the sixth-year molars. Having extracted one, the patient went away, and did not return for a year, or several months, and the teeth had taken a "cant" on one side. I had directed the patient most earnestly to come back within a few days and have the other tooth extracted. Such results will occur in practice; we have no right to look upon them as testing the propriety of the practice generally. The judgment of the dentist should be most carefully used in such cases. If the lower jaw is already a receding jaw, and he finds it necessary to extract all four of the molars, he should extract the upper ones first, and see if he can get the desired result in the falling back of the upper teeth. It may prove that the extraction of the upper molars alone is necessary.

Dr. James Truman, of Philadelphia. It seems to me that the controversy between Dr. Clowes and Dr. Kingsley might, as Dr. Dunning has remarked, be narrowed down to a slight difference. He (Dr. Clowes) asserts, if I understand him, that the point of contact will always result in decay. Dr. Kingsley asserts that this is not universally the case.

Dr. Clowes. No, sir; the point of contact is always the point of danger.

Dr. Truman. So I also say. The point of contact is always the point of danger, let that be where it may. It may be on the proximate surfaces, or it may be at the junction of the gum-tissue with the teeth at their necks; or that of any of the soft tissues surrounding or in contact with the teeth. While it does not follow that decay must necessarily result from this condition, the danger is always imminent.

It does not militate against the force of this proposition to assert that decay is not found in the teeth of aboriginal tribes; their diet is an uncivilized one, but nearer to nature. The food of civilization is eminently destructive in its character. An analogous case may be found in the ruminant fed on grains and grasses and one receiving its nutriment from the slops of the still. The latter is terribly and rapidly destructive, while the former is not.

There are many influences at work on the civilized being that have no existence in the savage state, hence comparisons cannot be forced. One of the most prolific causes of injury arises from the administration of acid medicines. Perhaps more teeth are ruined from this cause than all others combined. The degree of carelessness is unpardonable when the knowledge exists of the simple means necessary to counteract the evil,—the administration of an alkaline wash; but how seldom is this done! The sad cases that constantly come under our notice are a disgrace to the intelligence of the medical profession, and worthy the severest terms of censure.

Are we to understand that the secretions deposited at the point of contact give an alkaline reaction? If so, decay ought not to occur. But this can be only exceptionally true; acid at this part will be the rule, and where we find acid, an increased quantity of parasitic growths is always present. Were it not for the fact that the alkaline saliva very frequently neutralizes this condition, there would be no salvation for these teeth.

The presence of sensitiveness in all cavities indicates the irritating effects of an acid. We meet this in a marked degree at the folds of gum-tissue, at the necks of teeth, but frequently lose sight of the cause. The sensitiveness and the decay may be temporarily abated by the use of an antacid. In the majority of cases sensation is reduced to a minimum by the application of the bicarbonate of soda, allowing it to remain some moments in the cavity. It seems to me we argue too much from isolated cases, losing sight of general principles upon which all action should be based.

The sixth-year molar is eminently worthy of being defended. It would seem from the arguments used, advocating its destruction, that nature had made a mistake in its production. This idea cannot be entertained for a moment. We violate a positive natural law whenever we doom one of these to destruction. That efforts made to save these teeth have failed in many cases must be acknowledged, but have those efforts been properly made? I think too great a reliance has been placed on the preservative qualities of gold foil. Gold foil is not suited to this class of teeth. The first molar ranges with the deciduous in density, and must come under the treatment that we would give to them. Gold is one of our best conductors. The irritating effects of heat and cold are so well known, that its continued use, in teeth so ill fitted to bear this, is certainly not good practice. Tin is infinitely better, and in many cases gutta-percha would be preferable. Other means besides filling must be resorted to to accomplish their preservation. While they retain this deciduous character they must be kept from contact with adjoining teeth. Separate the second deciduous molars from them on the anterior surface, and the second molar on the distal surface, and these two are secured. Care with other exposed surfaces will keep them. Time will secure density, and we then have a tooth possessing the broadest masticating surface preserved for lengthened usefulness.

The great effort seems to be to save the wisdom-teeth. Now, these are by no means the best teeth, and cannot be compared with the first molars.

If the sixth-year molars are removed, what may result? If I understand anything of the philosophy that underlies this question, it would lead me to fear deplorable results in another direction. The tendency of all the teeth is to move from the central or mesial line posteriorly. The peculiar formation of the arch is maintained by the close proximity of each tooth. In proportion, then, as you multiply spaces you destroy this symmetry, and produce irregularity. When the first molars are removed, the large space made allows the second bicuspid to fall back. It is followed by the first, that by the canine, and finally the central incisors separate, leaving a space that I regard as one of the most difficult forms of irregularity to treat. The tendency to retrograde will render abortive all attempts to restore them to normal position. The question comes home with force to each one of us, Have we a right to create a deformity in the hopes of a prospective good in some other direction?

Did time permit, I should like to say a word on the use of metallic fillings. I think the intelligence of the profession will demand in the near future, if not at present, a closer observation of results. Metals have never met all our requirements, and from their nature never can. Certain conditions require a peculiar kind of treatment; in fact, this must be varied to suit the case. No one article ever did or ever will accomplish all we require of a filling.

Dr. A. C. Hawes. I must say my opinion in regard to the removal of the sixth-year molar has been somewhat modified within a few years past, but I believe there are far too many of those teeth extracted at the present time. They cannot be extracted, I believe, without great interference with the symmetry and beauty of the arch of the mouth. The arch is necessarily narrowed very considerably after the extraction of those teeth, and if they can be preserved until twelve or fifteen years of age without the pulp becoming exposed, they are easily salvable. With Dr. Truman, I have found it preferable to fill those teeth with tin foil or gutta-percha for young children, until the age I have just mentioned. I am quite sure those teeth cannot be extracted without changing the whole expression of the face.

Dr. John T. Codman, of Boston. I wish to say something on this subject. Judgment is fallacious, principles are eternal, and when we shall decide the principles on which these actions take place, then there will be no diversity of judgment. I say that this idea of pressure being dangerous is fallacious. Pressure is an important element in the development of the teeth in the jaw. The development of the teeth depends to a great extent upon their being wedged apart by a contact of the teeth themselves. Dr. Truman has given us a little drawing upon the blackboard of an upper arch with a missing tooth. We have there a diminished arch. That diminished arch would not have been, I maintain, if the teeth were there and were pressed together; that pressure producing a development which there is missing. Now, I do not say that under certain circumstances it may not be right to extract the sixth-year molar, but I do say, as a principle, it is wrong. But the mischief does not lie where we suppose it does. It does not lie in the development of the second teeth. It commences far back in the development of the first or temporary teeth, and more particularly in the change between the eruption of the first and second teeth. I have constantly observed the wrong habit that prevails among us of bringing about the second dentition; the wrong manner in which the teeth are allowed to develop themselves producing the trouble that we afterwards attempt to remedy by extracting the sixth-year molars.

The secretary then read a paper on "An Improved Method of Taking Plaster Impressions," by J. Smith Turner, M.R.C.S., London, England.*

After the reading of this paper, Dr. C. R. Butler exhibited an appliance for carrying retaining screw wire, composed of a holder and two drills, describing the manner of using it, as follows:

The screw should be cut sharp, and a nick cut across the wire the length you desire to have the screw after it is set. Then having drilled a hole with the proper-sized drill, turn your screw with a firm pressure until it strikes bottom, when it breaks off, and your screw is set there for all practical purposes. The drills used should correspond accurately in size with the wire, and be made to cut in a straight line.

Dr. S. S. White offered one of his burring-engines complete, with all its attachments, for the best answer to the following (the papers to be submitted to the Executive Committee for judgment upon their merits):

The pulp of a tooth being deprived of a portion of its normal protecting wall, it has been observed that tissue, analogous, apparently, to dentine, has been deposited in the orifice, closing it entirely, and thus restoring the condition necessary to the preservation of the pulp.

This result having occurred occasionally, it is important to know whether any one substance used as a covering has been more frequently followed by such deposits than when others have been used.

Is the necessary amount of lime held in solution in the blood of all healthy persons? If so, how can the vital forces of the part be stimulated to make a reparative deposition, as is done where fractured bones are properly set and protected?

Can this action be induced? or is it only necessary, in order to obtain such deposits generally, that the pulp should be freed from all irritating agents and be protected by a wall, securing it from foreign substance and abnormal thermal changes?

The meeting then adjourned.

The society met at the residence of Drs. Francis and Carr, Tuesday evening, May 18th, 1875, President A. L. Northrop in the chair.

Letters were read from several gentlemen expressing their regret at being unable to attend the meeting.

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* This paper was published in the DENTAL COSMOS, February, 1875.

Dr. W. H. Dwinelle. It has been my custom in cases of regulating, not only to take an impression of the interior of the mouth, but also of the exterior; and it has been interesting to me to make a comparison of the models of the parts, externally and internally, at the commencement and at the end of the operation. I have quite a number of such specimens, of which I have brought two to-night. (The doctor here produced two plaster models, the one representing the frequent V-shaped irregularity, and the other representing the same case after regulation, together with the plaster casts of the face from the base of the nose to the chin.) I may say in passing, in corroboration of statements made by Dr. Kingsley recently, that this case was virtually regulated in sixty days. That is to say, I succeeded in bringing the arch to the condition in which it now is in that time, though for many months it was necessary to wear a retaining-plate.

Again, gentlemen, by way of incidents of office practice: thousands of years ago the Chinese discovered great potency in the essential oils, especially the oil of peppermint, for neuralgic affections. Several years ago, a gentleman handed me a little package that he had brought from China, saying it was a sovereign remedy for all forms of neuralgia. I tried it and found it a potent remedy for facial neuralgia; and that an application of it over the gums of inflamed and neuralgic affected teeth was attended with very gratifying results. Wherever we wish to introduce counter-irritation, these oils are of great value. I don't know but I should apologize for the presentation of so simple a remedy, but our pharmacopœia is limited, and any new contribution should certainly be welcomed.

In regard to the use of amalgam fillings: I have sometimes built entire crowns with it; in some cases, however, the weight is found objectionable, a large crown of amalgam having a very perceptible weight. I have recently avoided this to a great extent by adjusting a core corresponding to a diminished crown, arranging it in place, and building around it; after the amalgam had become consolidated, cutting into and digging out the core, and supplying a thin cap to cover the orifice. This is seemingly a great advantage.

A member. Wouldn't it be as well to use a light material for the core, and leave it in?

Dr. Dwinelle. I suppose it would; but if one goes to the trouble of such an operation, he desires to have the weight materially lessened. When you can make a very thin hollow stopping by digging out this core, and have it at the same time light and practicable, I think it best to do so.

Dr. J. W. Clowes. For myself, I never have observed that amalgam built up solid was any too heavy. I have never heard any such complaint, and I cannot conceive how it can be so. Even in cases of solid gold, I have never heard any objection to the weight. My practice has been, and I have found it quite satisfactory, instead of having a core, to make an undercut and place one or two screws in the tooth. If there be two roots, put in two. The screws may be of iron, platinum, or of gold. I have frequently used an iron screw. If we depend entirely upon the undercut in the root, the fastening would weaken the root too much; but if we depend more upon the center screw, we do not have to take away so much of the strength of the root, and it makes a fine piece of work. Sometimes I use a little cylinder of the same shape as the crown, but generally I can build up my amalgam crown perfectly well with this little stay.

Dr. A. H. Brockway. I have found it advantageous in my practice to use the mallet in the insertion of amalgam fillings. It consolidates the amalgam and throws off the mercury. I frequently use punk under the instrument in malleting amalgam.

Dr. O. E. Hill. If the object of malleting is to get rid of the excess of mercury, I would inquire if you could not do that even more effectually by the use of an instrument slightly warm. You will get rid of more quicksilver by the use of a warm instrument than by any other method. Besides, cavities where we can use a great deal of force—malleting force—are not the places to which amalgam fillings are adapted. If you intend putting in a large amalgam filling, an excellent method is to take a piece of tin that will occupy one-half the space of the cavity,—a solid tin plug,—insert that and fill around it. Leave the tin in, and the excess of quicksilver that may be in the amalgam will be absorbed by the tin. That I have found to produce an excellent filling.

Dr. Brockway. I have tried both methods, and I decidedly prefer malleting; and I think it can be demonstrated that more mercury can be got rid of by malleting than in any other way, and that the results are decidedly better.

Dr. W. A. Bronson. It seems to me that malleting produces a filling much superior to the ordinary method of introducing amalgam. Gentlemen will be surprised at the effect the light taps of the mallet produce upon an amalgam filling. Dressing off an amalgam surface, with the exception of Fletcher's, with tin foil, rubbing it down and burnishing it off, leaves a very beautiful finish.

Dr. Brockway. I have adopted a hint dropped by Dr. Bogue, of using crystal gold on surfaces in preference to tin. It takes up the mercury more readily and leaves a harder surface.

Dr. Dwinelle. Dr. Clowes remarks that he does not see any objection that can arise from heavy crowns. If he will reflect a moment, instances must occur to him wherein he has seen manifest trouble from solid masses of gold or amalgam in very frail teeth. A principle of mechanics comes in there, namely, that where a heavy material is supported by, or in contact with, a frail material, the weaker must inevitably be, to a greater or less degree, overcome by the stronger. This principle is so thoroughly recognized that oftentimes some of our most promising inventions have been obliged to be abandoned because they involved a constant succession of arrested momentum. A piece of mechanism would start, and suddenly come to a stop This, continually repeated, resulted in knocking the mechanism itself in pieces.

Dr. C. P. Fitch. I do not question the philosophy of the last speaker in reference to that principle if applied to mechanism, but I question whether it applies to the human teeth. I think the movement of the human jaw, in the antagonism of the teeth, is not such as to produce the result he mentions, unless the filling antagonizes with a frail tooth. Almost all the teeth we fill with the cheaper materials are in an advanced state of disintegration, and in such cases the weight is doubtless objectionable. But I never had patients complain of the weight of fillings as unpleasant. I can readily see that the same objections might be urged against gold as against amalgam, if it has merely reference to the weight of the filling. I am in the habit of using amalgam, and I suppose there is a happy medium in getting the best result with it. I take it that if you press too much mercury out of it, you prevent that proper crystallization which will give you the best result. It is a possible thing to press so much of the mercury out as to make the amalgam weak and friable. The great desideratum in practice is to know how much mercury to leave in our plugs, and not be so careful to get all the mercury out. For the purpose of extracting the mercury I do not think malleting is superior to pressure. It might, perhaps, bring a little more to the surface, but that has not been my purpose, and I have always thought it best to leave a certain amount of mercury in, in order to get the best results.

Dr. Hill. I think this idea of eliminating the mercury from amalgam is sometimes carried too far. My experience agrees with that of Dr. Fitch, and I think if you get rid of too much quicksilver, your filling is not good. It will not wear. There may, however, be a difference in amalgams in this respect. I have squeezed the mercury out with pliers, and after letting the amalgam lie for a day or two, found, upon handling it, that it would become a powder.

A member. What amalgam was that?

Dr. Hill. Holmes's amalgam.

Dr. Brockway. In my experience I have met with none of the bad results mentioned. On the contrary, I have found the fillings upon which I have used the mallet remarkably hard and firm. I conceive there is an advantage in the use of the mallet other than that of expressing all the mercury. I do not pretend nor desire by its use to remove all the mercury possible, because if that were my desire I could effect more by the use of additional gold upon the surface. I use the mallet for condensing the material, and removing the *excess* of mercury merely. At the last finish I usually touch the surface of the plug lightly with crystal gold, which absorbs the mercury immediately upon the surface. Then with a burnisher I dress down and burnish the plug.

Dr. Clowes. I have recently noticed, in the enumeration of improvements in amalgam, that platinum is spoken of as being an important ingredient for preventing discoloration of the filling. Some years ago I tested the combination. I found that there was no affinity between quicksilver and platinum, and that if enough platinum is put in to prevent tarnishing, the filling has a tendency to crumble. Therefore I do not think that platinum increases the utility of amalgam.

Dr. Coy, of Baltimore. I have used amalgam for a number of years, and never except as a plastic filling. That, I think, is its proper use, and when you have expressed all the mercury possible, then it is no longer a plastic filling. I filled teeth over twenty years ago with this material, not attempting to express all the mercury, and those fillings are good to-day. That shows that amalgam, as I used it, can be made a good, durable filling.

Dr. Brockway. I see I am not exactly understood. I do not use the mallet for the purpose of expressing the mercury, but for the purpose of condensing the filling. I do not use amalgam as a plastic filling in those cases where it would be, if not impossible, so extremely difficult to use gold that I should not feel justified in making the attempt. I do not, before using mercury, express all the mercury I can with the pliers, but merely so much as I can express with my fingers. That leaves it in such a state of plasticity that it can be readily introduced into any cavity. I then apply the mallet, and the consequence is the condensation of the filling and the expression of the free mercury there.

Dr. N. W. Kingsley. I did not intend to say a word, but the old, repetitious tone of discussion here to-night leads me to call your attention to a few things. The profession is devoting a great deal of time, intellect, and expense to a complete and thorough investigation in this direction. But I would ask, What is the use of their doing that if we are not going to profit by the results? Now, at the meeting of the society last December, we had reports of a long series of experiments made by different gentlemen in whom we have the utmost confidence as to their ability to make correct experiments, and we ought to abide by the results. I have not read those papers since their publication, but my impression is that the conclusion arrived at in them was that all attempts to express mercury out of amalgam, after it is mixed, are wrong. And since that time I have been governed by that authority in my practice. I believe those gentlemen knew what they were about, and that they made their experiments so as to secure a more thorough and reliable test than can be done in any way in the mouth. What did they say? "Instead of mixing your filings, or whatever form it is in, with your mercury, and squeezing it until you have got it to that happy medium, work the filings into the mercury until it is as stiff as it can be used in a plastic state." Those experiments show that a certain amount of mercury is necessary in the filling. We are inclined, I think, to theorize without much knowledge If we looked upon the gentleman when he was operating, and saw him perform the operation, we would perhaps form a different idea from that conveyed by his verbal description of it. Nevertheless, to my mind the use of a mallet in putting in an amalgam filling is unnecessary and unadvisable. Where I have used amalgam, it has been in cases where I have wanted a filling of a plastic nature, so that I could build up, as an artist in clay builds up, and I would just as soon think of taking a mallet to model a clay image as I would an amalgam filling.

Dr. Clowes. I have been induced to write this brief paper in order to clearly and definitely make known my position in regard to certain subjects with which I have been associated for a number of years. I have discovered that a person may make a statement in the most explicit language and that it may be entirely misinterpreted, or perhaps a brother in the profession would put entirely different words into my mouth from those I really expressed. I refer particularly to an instance where, in reference to *contact*, I was said to declare that "contact is always a cause of decay." I never said such a thing, and yet that language has been repeatedly ascribed to me by gentlemen who certainly know the importance of correct statement. In order that the mistake may not be continued, I have written as follows:

FACTS.

Facts are my theme. While about my daily labor, when I come here, wherever I may be, I glory in them, and aspire, by exactness and precision in word and work, to give them *emphatic* expression. When many years ago I called the dental file "blessed," and said that "skillfully used it would work out its own praise, and its capacity for usefulness be truly marvelous," it was a fact of preservation. When, more recently, I said that "the cause of alveolar abscess was *not* a dead tooth but the *presence* of a *dead nerve* in the tooth," I was but enlarging the area of fact. When I said of the rubber dam, that "it would keep cavities perfectly dry in even the wettest parts of the mouth unassisted by any of the appliances previously used for that purpose," and that "it is one of the very best aids to the highest professional achievements," it was an elastic and comforting fact. When I said that "amalgam was a 'special providence,' accomplishing and securing the salvation of myriads of human teeth which would otherwise have perished," it was a fact of increased mastication. When I declared the "sixth-year molar one of the greatest mischief-makers in the human mouth," it was a fact on crowding. When the dens sapientiæ was proclaimed by me the "strongest of all the molars," it was a substantial fact, founded in wisdom and written all over its flinty surface. And when, at last, I announced the axiom that "contact among human teeth is always dangerous, its continuance a constant menace of evil,—that it is a frightful and prolific source of disease,—in that it presents the opportunity, invites attack, and provides a secure harbor for inimical forces," I uttered a fact paramount, a truth self-evident to all who possess the faculty of intelligent observation and perception. That the causes and sources of dental decay are growing in number is a lamentable and painful fact. The chemist, the physician, the confection- and condiment-makers are all equally active in this work of demolition, and the result is a fact of destruction.

In all seriousness I ask, Is this profession sufficiently awake to these alarming and momentous facts? Will it indeed be equal in the future to its glorious mission? Will its ability to save be greater than the power of antagonistic forces now set against it, arrayed and arraying for its defeat? I know that the victory can rest on our side *only* as we are faithful. We can be faithful only as we become wise in *cause* and *effect*. We can baffle disease only by attacking its cause, and our crowning victory will come, if it come at all, by our ability successfully to *prevent*.

Dr. W. H. Atkinson read a paper upon "The Differential Character of Caries and Necrosis."

Adjourned. WM. JARVIE, JR., *Rec. Sec'y.*

FIRST JUDICIAL DISTRICT DENTAL SOCIETY.

REPORTED BY F. M. ODELL, D.D.S.

AT a meeting held at the office of Dr. F. M. Odell, April 6th, 1875, Dr. William M. Reynolds, Vice-President, in the chair, the subject for consideration being "Dental Appliances," Dr. William E. Hoag read a paper from Dr. E. G. Wheeler, of Mobile, Alabama. Dr. Jarvis, the essayist appointed for the evening, read a paper on the same subject.

Dr. William H. Atkinson read a paper from Dr. Mills, of Hartford, in which tin foil was recommended to be used in combination with gold foil for filling large cavities. Some remarks were made concerning the liability of the two metals to induce a galvanic current, resulting in death of the pulp or decomposition of the tin.

Dr. Carr remembered a case in his practice, some ten years since, where, upon removing the gold, the tin was found intact and the pulp dead.

Dr. Jarvis had found in a similar case the tin reduced to an impalpable powder of a dark-brown color.

Dr. Atkinson called attention to the comfort obtained, in working with the rubber dam, by the use of a simple stick, either at the bottom or sides, to keep the rubber free from wrinkles; the stick being held in position by simply stretching the rubber and allowing it to retract over the ends of the stick. In regard to the manifold dental appliances which have appeared recently, had bought about everything of any worth as fast as presented; could not afford to wait until everything was perfected. Can do as much work now in one day by the aid of the new appliances as twenty years ago he could have accomplished in six days.

Dr. Corydon Palmer read a paper upon the preparation of teeth and cavities for plugging, and illustrated the same by the exhibition of some very neatly-prepared paper patterns.

A regular meeting was held May 5th, 1875, at the office of Dr. V. Pressler, President Dr. R. M. Gage in the chair. The subject for discussion was, "Causes affecting the Health of Dentists." A short paper on the subject was read by Dr. J. S. Latimer.

Dr. John Allen spoke of out-door exercise as one of the first conditions for the maintenance of health; second, entire abstinence from all stimulants; third, the proper selection of food. The system calls for only thirteen substances which are required for making tissue, and we should supply such foods as furnish them.

Dr. George A. Mills said the occupation of dentistry holds out the greatest temptation of any other profession to neglect our own health; if we are in active practice, a great variety of circumstances make it almost impossible for us to be regular in our habits.

Dr. Shumway believes in the fishing-rod as a great means to health. Has earned the reputation at home of preferring to fish any day rather than work.

Dr. Atkinson spoke of having good, sound sleep, during the proper time for sleep, as one of the most important things which we need. It has been said, "A physician or a fool at forty;" but I guess the world is full of fools if judged by that standard. We are very far from being in health when we are conscious that we are not in proper condition. A law cannot be infracted without making itself felt; the law of nutrition is simply satisfaction of the needs of the system. All this is done in us and for us more than by us; there is the power residing in the system which can, if we shall be so full of business as to let nature work in and for us, select and appropriate the proper aliment. I think that dentistry is as hard physical work as chopping rails.

Dr. Shumway spoke about ivory points. Considered that about all that they were valuable for was in enabling one to take advantage of the cohesive properties of the gold, and stick to that entirely. I object to the term adhesive as applied to gold foil; the particles cohere or unite at an insensible distance providing the conditions are satisfied. In malleting, in addition to cohesion you get a mechanical union. You cannot have the two conditions at the same time; by simply heating the gold you can cause the particles to unite; it is not welding,—it is only done by heat; the particles of gold, like two drops of water, unite at an insensible distance; you cannot see how, but they do it. But whether it is safe for you to rely upon that exclusively is a thing for you to determine.

After four years' experience with it, my judgment is that it is sufficient. Have filled a split twelfth-year molar with it, and it seems to wear as well as any mallet-filled tooth. I do not have a burnished surface, nor is it obtained by pressure, but simply by heating. If you get a rough surface, you cannot make so perfect a filling as by retaining a smooth one. This method is more adaptable to large cavities. I fill small ones in the ordinary manner.

At the clinics this afternoon seventy persons attended. Mr. I. Smith Hyatt gave a clinic in the manipulation of celluloid. Dr. Frank Abbott plugged two cavities with annealed No. 4 soft foil, and capped one exposed pulp, building over same a Hill's stopping temporary plug. Dr. George A. Mills, of Hartford, plugged two proximal cavities, connected by crown-fissure, using heavy foil, No. 20, and smooth points, with a hand-mallet. Dr. Shumway, of Plymouth, Massachusetts, built up a large cavity in a bicuspid, using annealed cohesive gold and rather rough, ivory-pointed instruments; gently working the masses down by hand (no mallet and hardly any pressure), depending upon the love of the particles of gold for each other. The filling is anchored in the usual manner by the mallet, but as soon as an anchorage is obtained and a layer of cohesive gold left exposed, the mallet is entirely abandoned for the ivory points.

The annual meeting of this society was held at the office of Dr. J. B. Littig. The President, Dr. R. M. Gage, in the chair.

The clinic committee reported ninety dentists in attendance at the clinics this afternoon, and a deep interest manifested. Operators, Drs. Francis, Odell, Goble, W. M. Reynolds, and Dr. Fishbough, who gave a demonstration in the working of celluloid.

Dr. Francis plugged an anterior proximal cavity in a superior right lateral with No. 3 soft Globe foil, annealed, where not in contact with the walls of the cavity, and finished off the surface with No. 60 Rolled Globe foil.

Dr. Odell plugged three crown cavities in an inferior right dens sapientiæ (protruding very slightly above the gum) with No. 4 soft Globe foil for the body of the plug, keyed in by a few pellets of No. 4 Quarter-century foil, annealed.

Dr. Wm. M. Reynolds plugged the pulp-canal and posterior proximal cavity in a superior right cuspid, using for canal simply gutta-percha; and for cavity, Globe foil No. 5, soft. Tooth had been devitalized five years previously by oxychloride of zinc, and pulp not removed. It has since shown no unfavorable symptoms (July 1st).

Dr. Goble built up a compound cavity, anterior proximal and grinding surfaces of superior left first molar, using the S. S. White automatic plugger, attached to an S. S. White engine; he is much pleased with the plugger, and thinks it preferable to anything of the "automatic" kind ever invented.

All the operators used the rubber dam excepting Dr. Odell, who kept his work dry with small mats of paper over the parotid ducts, and a small napkin covering the inferior ducts, and passing around the tooth.

The secretary reported fifty-one active, five corresponding, and two honorary members; and that during the year nine meetings have been held, eight subjects discussed, and sixteen essays and papers read.

The following are the officers elected for the year ending June 1st, 1876, viz.:

President.—J. S. Latimer.
Vice-President.—J. B. Littig
Secretary.—F. M. Odell.
Treasurer.—Chas. Miller.

The clinic committee consists of Wm. Carr, Chairman, Wm. H. Atkinson, E. A. Bogue.

A vote of thanks to Dr. S. S. White and to Frank Harmstad was then passed, for their exceedingly active attentions to us at the clinics.

Adjourned to the first Tuesday in October.

GEORGIA STATE DENTAL SOCIETY.

The seventh annual meeting of this society was held in Atlanta, Monday, May 10th, adjourning May 13th. The President, Dr. Patterson, of Waynesboro', Ga., presiding.

The meeting was well attended, and gave evidence of much progress in the profession in Georgia. A flattering number of new members were added to the roll. The following reports were read by gentlemen composing the various committees:

Chemistry and Therapeutics.—Dr. E. Parsons, Savannah, Ga.

Histology and Physiology.—Dr. Charles C. Allen, Marietta, Ga.

Operative Dentistry.—Dr. A. C. Ford, Atlanta, and Dr. M. S. Jobson, Perry, Ga.

Mechanical Dentistry.—Dr. S. G. Holland, Atlanta, Ga.

Dental Education.—Dr. John H. Coyle, Thomasville, Ga.

The address of the president, Dr. George Patterson, of Waynesboro', was an able and scientific production, well worthy of the applause it called forth. This address was ordered printed for the use of the members.

Dr. M. S. Jobson read a paper containing statistics of nerve-capping in his practice. It was a valuble addition to the archives of the society. Bearing upon the same subject was a very instructive essay by Dr. W. C. Wardlaw, of Augusta, advocating the use of the ordinary pattern plate gutta-percha dissolved in chloroform as a capping for exposed or aching pulps. Other essays were read by members of the society, and many valuable ideas presented.

Suitable resolutions were read and spread upon the minutes in regard to the death of Dr. J. A. Fuqua, of Atlanta, an esteemed and honored member of the Georgia State Dental Society.

One step taken, indicating a healthy ambition, was a resolution to make arrangements for the purchase of a microscope for the use of the society.

On motion of Dr. E. Parsons, the president appointed a historian to collect all items of interest pertaining to the history of the society from its origin to the present time; to arrange in suitable form for publication the transactions, essays, debates, etc., and to report upon the same at the next meeting of the society.

The annual election resulted in the following list of officers to serve the society during the following year:

President.—Dr. George W. McElhany, West Point, Ga.

First Vice-President.—Dr. M. S. Jobson, Perry, Ga.

Second Vice-President.—Dr. John H. Coyle, Thomasville, Ga.

Corresponding Secretary.—Dr. Charles C. Allen, Marietta, Ga.

Recording Secretary.—Dr. D. Smith, Atlanta, Ga.

Executive Committee.—Dr. E. Parsons, Savannah; Dr. W. C. Wardlaw, Augusta; Dr. A. C. Ford, Atlanta; Dr. W. F. Tigner, Columbus; Dr. John H. Coyle, Thomasville.

STANDING COMMITTEES.

Histology and Physiology.—Dr. George Patterson, Waynesboro', Ga.; Dr. E. Parsons, Savannah.

Pathology and Surgery.—Dr. A. C. Ford, Atlanta; Dr. R. A. McDonald, Griffin.

Chemistry and Therapeutics.—Dr. J. D. McKellar, Macon; Dr. S. G. Holland, Atlanta.

Operative Dentistry.—Dr. S. G. Robertson, Cuthbert; Dr. W. C. Wardlaw, Augusta.

Mechanical Dentistry.—Dr. W. F. Tigner, Columbus; Dr. R. B. Adair, Gainesville.

Dental Education and Literature.—Dr. E. M. Allen, Marietta; Dr. H. A. Lowrance, Athens.

Clinical Operators.—Dr. L. D. Carpenter, Atlanta; Dr. James Hart, Hawkinsville.

Historian.—Dr. Charles C. Allen, Marietta.

Committee on Instruments, Appliances, etc.—Dr. L. D. Carpenter, Atlanta; Dr. S. G. Holland, Atlanta; Dr. J. P. Holmes, Macon.

Committee on Microscope.—Dr. A. C. Ford and Dr. Samuel Hape, Atlanta.

Committee on Arrangements.—Dr. Samuel Hape and Dr. William Crenshaw, Atlanta.

Delegates to American Dental Association.—Dr. H. A. Lowrance, Athens, Ga.; Dr. A. C. Ford, Atlanta, Ga.; Dr. J. H. Coyle, Thomasville, Ga.; Dr. M. S. Jobson, Perry, Ga.; Dr. Charles C. Allen, Marietta, Ga.

Delegates to Southern Dental Association.—Dr. E. M. Allen, Marietta, Ga.; Dr. J. P. Holmes, Macon, Ga.; Dr. W. F. Tigner, Columbus, Ga.; Dr. R. B. Adair, Gainesville, Ga.

Adjourned until the second Tuesday in May, 1876.

CHARLES C. ALLEN, D.D.S., *Corresponding Secretary.*

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE fifth annual meeting of this association was held on the 4th of May, in the city of Columbia, S. C.

The meeting was well attended, and the discussions harmonious, spirited, and interesting.

A Board of Dental Examiners, in accordance with the provisions of the bill recently passed by the Legislature of the State for regulating the practice of dentistry in South Carolina, was elected, consisting of the following gentlemen: J. W. Norwood, Greenville, S. C.; J. B. Patrick, Charleston, S. C.; J. S. Thompson, Abbeville, S. C.; W. S. Brown, Charleston, S. C.; D. L. Boozer, Columbia, S. C.

Among the topics of interest discussed were the following:

Subcutaneous injection of ergotine and internal administrations of the same in form of pills for the suppression of violent and persistent hemorrhage after extraction; application of actual cautery by means of electricity for the same purpose, and for painless devitalizing of pulp.

Dr. Rice denounced the employment of arsenic; uses with entire success a mixture consisting of ten grains acetate morphia to the ounce of carbolic acid, which he considers almost a specific in the treatment of toothache from exposed pulp. Good results had been secured by him in the use of oxychloride of zinc for capping exposed pulps. It is variously used, some applying it directly over the exposed pulp, some using a covering of paper, kid, etc., and some using the white oxide of zinc next the exposed pulp, and filling over this with oxychloride of zinc. All agreed in the necessity of flooding the cavity, before introducing the filling, with carbolic acid or creasote, and using the rubber dam to protect against moisture.

Very favorable reports were made by those who had used the "modeling compound" (manufactured for S. S. White), for taking impressions of the mouth. It was pronounced cleaner and pleasanter to both patient and operator, taking a sharper impression than wax.

A like favorable report was made of "Parker & Teague's impression compound," granting to it all that was claimed for it by the inventors.

The following officers were elected to serve for the ensuing year:

President.—G. F. S. Wright, Columbia, S. C.

First Vice-President.—J. W. Norwood, Greenville, S. C.

Second Vice-President.—B. H. Teague, Aiken, S. C.

Corresponding Secretary.—J. S. Thompson, Abbeville, S. C.

Recording Secretary.—T. F. Chupein, Charleston, S. C.

Treasurer.—T. W. Bouchier, Cheraw, S. C.

The second Thursday of June, 1876, was selected as the time, and Greenville the place, for the next meeting.

After an address by the retiring president, adjourned to meet as above.

THEODORE F. CHUPEIN, *Recording Secretary.*

UNION CONVENTION OF THE MASSACHUSETTS DENTAL SOCIETY AND THE MERRIMACK VALLEY DENTAL ASSOCIATION.

AT a union convention of the Massachusetts Dental Society and the Merrimack Valley Dental Association, the inclosed resolution was passed. In compliance with that vote I forward it to you, with the request to publish in your journal:

Resolved, That we, the members of the Massachusetts and Merrimack Valley Dental Societies, in convention assembled, recommend to all dental practitioners the discontinuance of the use of *rubber* as a base for artificial teeth, and the adoption in place thereof of celluloid, believing this course would not only be for the best interests of ourselves, but for our patients, whom we serve.

Voted, on motion of Dr. McDougal, that a copy of the above resolution be sent to all the dental journals of the country, with a request to publish.

GEO. F. GRANT, *Rec. Sec. Mass. Dental Society.*

THE AMERICAN ACADEMY OF DENTAL SURGERY.

THE regular meeting of the "American Academy of Dental Surgery" was held on Thursday evening, June 10th, President Dr. George H. Perine presiding. After the usual order of business was completed, delegates were elected to the several associations, namely: Dr. A. P. Merrill, delegate to the American Dental Society of Europe; Drs. Frederick S. Howard and G. S. Meigs, delegates to the American Dental Convention; Drs. J. Adams Bishop and N. Malon Beckwith, delegates to the Pennsylvania State Dental Association; Drs. R. P. Perry and Geo. E. Adams, delegates to the American Dental Association.

The subject was debated as to holding a meeting, extending invitations to members of the profession other than active and corresponding fellows of the academy, here and abroad, which was finally agreed upon.

A number of gentlemen were elected active and corresponding fellows of the academy.

Dr. Geo. H. Perine made some interesting remarks on the use of the galvano-caustic battery in oral surgery. He gave some illustrations with the use of a very powerful battery, which he regulated for operations in the mouth, and cited cases in which he had employed it with very satisfactory results.

On motion, meeting adjourned.

N. MALON BECKWITH, *Secretary.*

AMERICAN DENTAL ASSOCIATION.

THE fifteenth annual meeting of the American Dental Association will be held in Grant's Hall, Niagara Falls, New York, commencing on the first Tuesday (3d) of August, 1875. The committee have up to this date completed the following arrangements:

The Cataract House will accommodate delegates at four dollars per day, and the International at three dollars and fifty cents; rooms will be reserved at either house for parties making known their desires a few days beforehand. Gentlemen accompanied by their wives should state the fact when ordering rooms.

The New York Central Railroad will sell round-trip tickets from New York to the Falls and return at seventeen dollars and fifty cents.

The Great Western Railway (of Canada) will sell tickets for the round trip at one full fare and a third. Parties desiring to avail themselves of these tickets should ask for excursion tickets to American Dental Association.

Round-trip tickets from Chicago, via Michigan Central Railroad, will be sold at twenty dollars, which is less than one and a third fare.

The Grand Trunk Railroad will also sell tickets for the round trip at one fare and a third.

The Cleveland, Columbus, Cincinnati and Indianapolis Railroad will sell round-trip tickets at the rate of four cents a mile one way, to parties of twenty or more.

George L. Field,
Chairman Com. of Arrangements.

C. Stoddard Smith,
Recording Secretary.

THE AMERICAN DENTAL CONVENTION.

(TWENTY-FIRST ANNIVERSARY.)

The committee have made arrangements with the proprietors of the Ocean House, Long Branch, for holding the twenty-first anniversary of the convention at that place, on the tenth day of August, 1875, at eleven A.M. The Messrs. Lelands have with their accustomed liberality tendered us (free of expense) a large hall suitable for holding the meeting of our convention; also, to deduct ten per cent. from the bills of those members stopping at their house.

Ample arrangements have also been made for the exhibition of instruments, implements, materials, etc., and all manufacturers and venders are earnestly solicited to make the display as complete as possible.

The profession at large are cordially invited to be present at this anniversary, believing it will be of unusual interest. The committee will secure rooms for those giving timely notice to the chairman.

J. G. Ambler, *Chairman of the Committee,*
25 West 23d St., N. Y.

EDITORIAL.

REPORTS OF SOCIETIES.

"The proceedings were extremely interesting and satisfactory, and the secretary was instructed to send a report to the Dental Cosmos for publication."

The "report" comes in the shape of a column or two, cut from a newspaper, the general tenor of which may be inferred from the displayed head-lines, of which the following are veritable examples now before us: "Tooth Carpenters to the Front;" "Tooth Haulers in Convention;" "What the Snaggers know about their Business;" "Discussions about Tooth-jerking." Doubtless the members of societies query frequently why their requests are not complied with. What would they think if such reports should be published?

The average newspaper reporter may not be expected to furnish an intelligent account of papers and discussions on subjects about which he knows nothing, and it seems to us a mere shirking of duty when a secretary furnishes such a report to a dental journal, with the statement that such journal is by vote of the society requested to publish a report of the proceedings. If dental associations are to be advanced in self-respect, in public regard, or in usefulness, they should see to it that some care has been given to the reports which their authorized officers send out for publication.

DENTAL EDUCATION.

In consequence of indisposition, Dr. Arthur was unable to furnish the contemplated continuation of his discussion on the subject of Dental Education in time for this issue. The paper will appear in the September number.

THE ANNUAL CONVOCATIONS.

According to adjournment, the American Dental Association will hold its fifteenth annual session at Niagara Falls, commencing on the first Tuesday (3d) of August, and continue in session four days.

The American Dental Convention will hold its twenty-first annual session at Long Branch, commencing on the second Tuesday (10th) of August.

Two Thousand Years After.—A new volume by Dr. J. E. Garretson, under the above title, is now in press.

PERISCOPE.

Dental Education in America —No one in this country will for a moment wish to deny the immense amount of good that has been accomplished by the dental colleges of the United States, and probably the independent position which they occupy has afforded such perfect freedom, that they have been able to carry out any scheme in regard to dental education that seemed right and good in their estimation. The promoters of these colleges must, however, recognize this fact, that they have themselves created the demand for a higher education by the training they have bestowed upon their graduates, and they must be prepared to supply the want that is felt of a broader and deeper basis of professional education, or their students will assuredly go where at present only it can be obtained, namely, to the purely medical colleges.

If the dental colleges can efficiently teach general as well as special anatomy, pathology, and surgery, so much the better. If they can have beds for in-patients so that they may properly train their students in medicine, let them do it; but unless they can do these things they had better not hinder the progress of their younger brethren by telling them that many of these things are unnecessary; rather let them stimulate their pupils to attain to the highest degree of efficiency in all that pertains to dental surgery by basing their special practice upon that of which it is but a part, namely, general surgery. All the speeches that have been or may be delivered will never make dentistry a separate profession, unless, indeed, those who hold this view can see their way clearly to isolate the oral cavity and its contents from the rest of the human body.

The promoters of the dental colleges in the States may, if they have sufficient enterprise, collect all their materials for teaching under one roof, and so economize the time and labor of their students; but they will then simply be teaching medicine and surgery at a dental college, instead of letting their pupils go to a medical college, where it would probably be done much more efficiently. They in no wise separate dentistry from medicine in fact though they may in theory, whilst by a fictitious isolation they narrow the mind of the student and naturally cause a feeling of jealousy among their purely medical brethren.

A good many hundred years ago Paul showed how each part of the body was dependent upon and bound up with the whole, and our American friends will find, if they care to examine the question, that the old apostle's teaching is equally applicable to the question of dental education in America in the present day.—*Editorial in Monthly Review of Dental Surgery.*

Dental Colleges.—I notice an editorial in the April number of the *Journal* on the organization of dental colleges. This is certainly a point of much importance, and might at this time be advantageously discussed. There is, however, a precedent question, the solution of which must ultimately determine the shape and form of dental education. I allude to the relation which dentistry is to sustain to medicine. If dentistry is to be regarded as a specialty of medicine, our schools are to be special schools. But if dentistry is to stand as an independent profession, our schools must be organized on a more comprehensive basis. This is a question which propounds *itself*, and the reply cannot be much longer deferred without detriment to our educational interests. It is evident that no uniform system of education can be agreed on until this question is disposed of. If it shall be so answered as to receive the assent of a majority of the profession, the co-operation of that majority can be readily secured in support of any scheme which promises a better education than is demanded by the now accepted standard.

With a view to the unification of our system of education, and to afford an opportunity to teachers of experience to compare methods and to discuss their respective results, as well as to consider the general subject of dental education, I proposed, as long ago as 1866, the organization of an association, to be composed of the members of the dental colleges of the United States, and of others who felt a special interest in the objects of the association. An "*Academy of Dental Science*" was proposed and accepted as a substitute for my proposition, accompanied by the claim that such an organization would effect all that a college association could do, and at the same time serve the interests of the profession in other ways.

How far this claim has been realized I am unable to say. Certainly no important changes originating in that body have been introduced into our schools.

I confess to the holding, at that time, of an idea, which, by a union of forces, contemplated the founding of one or more large, liberal, and *well-endowed* dental colleges in the United States, where the course of tuition would not be limited to five months, and where the range of instruction should be wide enough to meet every requirement demanded by our art. Shall something of this kind be revived, or shall we cultivate more intimate relations with medicine, and annex ourselves to that profession as one of its specialties? In my view this is the point first to be settled, in order that we may know what kind of schools to establish.—*C. W. Spalding, in Missouri Dental Journal.*

SUBLINGUAL CANCROID ULCER.—For the following notes we are indebted to Mr. Andrew S. Currie, M.B., house-surgeon.

The patient, a man aged forty-four, when admitted on January 6th, stated that about five months before he observed a small vesicle on the left side of the frænum linguæ, about the size of a pea, which ultimately broke, and an ulcer formed. A surgeon was consulted, who applied caustic three or four times; but the ulcer continued to extend, and the patient accordingly came to Mr. Spence for advice, when on the left side of the frænum linguæ there was a small ulcer about the size of a shilling extending backwards as far as the second bicuspid tooth. The inner edge of the ulcer was hard and everted, and in the center there was a prominent hard mass; the outer edge was in contact with the gum. The neighboring glands and the tongue were unaffected.

Mr. Spence operated on the 12th January in the following manner: An incision was made along the symphysis, and the jaw divided through the median line, and the two portions then held asunder. A ligature was passed through the tip of the tongue, in order that it might be sufficiently elevated. The ulcer was then excised, a periosteum scraper being used to detach it from the jaw. The bleeding vessels were next secured, and holes having been drilled through the symphysis, the sawn edges of the bone were approximated and tied together with silver wire. A piece of drainage-tube was passed from the mouth through the lowest part of the wound to allow the free escape of discharge. The silver wire which was used was rather fine, and as it gave way in a few days, a bandage was required to keep the divided portions of the jaw in position. Weak carbolic lotion was used as a mouth-wash. The patient progressed steadily to convalescence, and was dismissed cured on the 11th February.

The apparently trivial circumstance of the silver wire used for uniting the divided symphysis of the jaw being rather finer than generally used for that purpose caused a good deal of trouble in the management of the jaw, as, owing to the wire giving way at an early period, the bone required to be kept in position by bandaging, which is generally unnecessary in such cases. It is a good example of the necessity of looking after the *little* things connected with an operation.—*Reports Royal Infirmary, Edinburgh, in The Lancet.*

ROSE'S METHOD IN OPERATIONS UPON THE JAWS.—Dr. Burow, of Königsberg,* publishes two cases of operations on the jaw, in which he employs Rose's method of placing the head so as to prevent the blood passing into the trachea or pharynx, thus avoiding the necessity of performing tracheotomy, which is itself an important operation, and is, of course, liable to its own mishaps.

Rose proceeds as follows: The patient is to be placed with his head in such a position that all danger which may occur from blood being in the mouth during deep anæsthesia may be prevented. He should be anæsthetized lying on his back, if possible; then the cushion under the back being removed, so much of his body should be drawn over the edge of the operating-table that his head should hang down, with the crown vertical, in which position it should be fixed by a trustworthy assistant kneeling at the side. The operator sits (or stands) in front of the patient, consequently he has to invert all his incisions (*i.e.* make them from chin to vertex), and the blood thus flows out partly through the mouth, but the greater part of it by the choanæ and nose.

The operations for which Rose has generally employed or has proposed this proceeding, are resection of the upper jaw, uranoplastics, rhinoplastics, laryngotomy, tonsillotomy in children, and harelip cases, the latter without an anæsthetic, so as to prevent the swallowing of blood and the resulting disturbance of the digestion.

Rose has kept patients sixty-five years of age from two to three hours in this position under anæsthesia without unfavorable symptoms presenting themselves. There was evidence of obstructed venous circulation, and the head became decidedly swollen. Bleeding was freer than in the usual position, but the operation was much more quickly performed.—*Report on Surgery, by Dr. J. C. Warren, in Boston Medical and Surgical Journal.*

ANÆSTHETICS IN FRANCE.—Dr. Duplay has been reading a report upon two memoirs of M. Darin, one entitled "Recherches sur les Anæsthetics." Dr. Darin is not of the opinion of those authors who put forward that the protoxide of nitrogen causes insensibility by asphyxia. He has seen plants and animals live in an atmosphere full of it. In practice its innocence seems proved: out of 67,000 individuals anæsthetized by an American surgeon, there had not been any case of death, nor had any occurred out of 300,000 cases published in the States. According to the reporter, the difficulty of obtaining a great quantity of laughing-gas, and the short time the anæsthesia lasts, have made it to be abandoned.

In the discussion which followed this report, Dr. Trélat said he had read recently in Claude Bernard's treatise on anæsthetics that the protoxide is an anæsthetic of asphyxiating nature. As to the figures 67,000, which, according to the reporter, had been anæsthetized by the gas by the same person, this appeared to him unlikely, and it was an assertion coming from the other side of the Atlantic, so that it might be accepted or not, as we pleased. The anæsthetic had been, he observed, abandoned because the effect was not durable enough. Chloroform and ether are not asphyxiating, but have a tonic action on the nerve centers.

Dr. Perrin said that ether and chloroform have a poisonous effect on the elements of the nerves; this is not capable of being contested. He shared the opinion of Claude Bernard as to protoxide of nitrogen. Its action is prompt as lightning, and the awakening so rapid when the inspiring instrument is withdrawn, that practitioners are obliged to apply their instrument to the tooth beforehand. As to American observations, they must be accepted with a certain reserve. Horace Wells, after the first success obtained on experimenting on himself, was so hissed by the students on making his first public experiment that he gave it up and kept a menagerie. Since that a statue has been raised to him.

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* Berliner Klinische Wochenschrift, February, 1875.

Humphry Davy first tried the laughing-gas at Clifton, in an establishment where patients were treated by the inhalation of gases, and where the protoxide of nitrogen was the most employed. There were several cases of death. The appeal which Dr. Duplay has made (said Dr. Perrin) ought to be understood, and we should all give to the society the facts of our practice with regard to the employment of any peculiar anæsthetic agent. At Paris very little ether is used, and yet we ought to encourage attempts, according to the advice of Petrequin, and the Lyons School, which has given up chloroform. It is true that if the use of chloroform persists at Paris it is because it scarcely does any harm.

The next speaker, Dr. Magitot, said that the recent experiments of MM. Jolyet and Blanche show that the protoxide of nitrogen is irrespirable, and that the anæsthesia it causes is produced by asphyxia; it is impossible to obtain an anæsthetic state long continued enough for practicing a long operation; and he joined himself to his colleagues in asking for a committee of inquiry on the subject of anæsthetics in general, and on protoxide of nitrogen in particular.

The next speaker, Dr. Giraud Teulon, had, after an accident with chloroform, which occurred some ten years ago, employed ether as an anæsthetic, in the American method, which consists in overwhelming the patient. In children the success is immediate, and the sleep quite calm; the pulse does not slacken, and there is not that anxiety which accompanies the inhalation of chloroform. He covers the face of the patient completely with a napkin folded triangularly, which contains a sponge on which three or four ounces of ether are poured. In less than a minute sleep appears in children without alteration of the face or pulse, and the surgeon may act fearlessly. This morning he had performed an operation for strabismus on a young girl aged twenty-two, by this process, who fell asleep in two minutes, without presenting any alarming symptoms.

Dr. Blot gave his adhesion to the proposition of M. Trélat as to the asphyxiating property of laughing-gas, as he had latterly been present at the extraction of a tooth in a young girl who had inhaled this gas; she had all the appearance of asphyxia, and the inhalations had to be stopped, when the color reappeared, and all danger soon vanished. As to the observations of Dr. Teulon about ether, they are rather with those he had collected when he was *interne* of M. Velpeau, in 1847. He had never employed ether in large quantities, and did not approve of the English plan. Besides, it is not the quantity of the gas which kills; and, when accidents arrive, it is almost always—and in this respect we may usefully consult a report by Dr. Robert—among the first inhalations. There are some persons who, leaving out affections of the heart and lungs, or nerves, are fatally influenced by chloroform or ether, and yet we cannot certainly predict this before trial. It is in such cases that there is enormous danger in the large doses of ether.

Dr. Perrin remarked that, twenty years ago, Bonnet of Lyons employed the so-called English plan. There had been two or three accidents, and these will be communicated at the fitting time. Chloroform does not produce in children those reflex accidents noticed in adults.

Dr. Trélat said that the word overwhelming had struck him. This is a method that may be called asphyxiating. If we make the patient breathe gently vapors which are anæsthetic, we observe three periods: 1. A period of excitement; 2. A period of tolerance; 3. A period of insensibility, soon followed by complete muscular resolution. Ether may, when given in large quantity, at once produce accidents like those of chloroform.

M. Magitot said that the procedure of overwhelming is employed in anæsthesia by the protoxide of nitrogen, as the gas is contained in a vessel at a pressure of from five to six atmospheres.

Dr. Giraud Teulon said he would bring forward a number of operative facts which had given him a tranquillity he had wished for. The facts he had were new and worthy of being compared. It is certain, he said, that we may compare the anæsthetic effects of ether and chloroform; but as to the protoxide of nitrogen, that is different. Seven or eight years ago he was struck by the asphyxiated look of a patient anæsthetized by M. Preterre, in the service of M. Nélaton. Since, he had employed ether for the last ten years; he had only once had any fear, and that passed away. He had just made with M. Thaon, *interne* of M. Trélat, an iridectomy on a child of eight years of age, when all at once, when the operation was finished and the dressing terminated, he was frightened by the pallor of the child's face. A few manœuvers were required to put an end to this condition. And that was the only time where he had seen any comparison between the accidents arising from ether and chloroform.

Dr. Giraldès confessed he had a weakness for chloroform. The action of this agent is far more rapid on children than that of ether, which he had been obliged to give up; so that, until his ideas changed, he would prefer chloroform. It had happened to him in certain cases to produce anæsthesia by ether rapidly; but ten days ago he had been obliged, after employing, in the way recommended by Dr. Giraud Teulon, two hundred grammes of ether, to have recourse to chloroform to anæsthetize the patient. Many English surgeons prefer chloroform: at St. George's Hospital, in London, much ether is used. There have been no accidents with ether; and if we ask practitioners why ether is such a favorite with them, they reply that they are more sure with this agent than they are with chloroform. The inhalations of ether produce first of all a characteristic drunkenness; and lately he had had to knock down with chloroform a vigorous young man he was about to operate on for phymosis, and who wished to fight with him.

Dr. Duplay said he had limited himself to the part of historian. The memoir of Dr. Darin was not original, but the analysis of many works. He thought that the question of protoxide of nitrogen was not decided; he knew the experiments of MM. Jolyet and Blanche, which were related in the memoir. M. Darin had made experiments contradictory of these. We must strive to elucidate the question, and see whether the asphyxiating property of the gas is sufficiently proved. In America it is given continuously. Marion Sims published a case of ovariotomy which lasted one hour and a half. With regard to ether, there was in the memoir a series of letters addressed to certain English journals, relative to the manner in which the Americans administer it, and ether was shown to be much safer than chloroform.

Dr. Lefort said that in England the surgeon had not the responsibility of the accidents which might arise: there is a physician especially devoted to anæsthetics. In 1845 he had been anæsthetized by laughing-gas. Since then he saw Preterre anæsthetize, in the wards of Dr. St. Germain, at the Midi, an individual with phymosis. The blue and turgescent visage of the patient had terrified him.—*Medical Press.*

Prof. Schiff on Ether and Chloroform.—Professor Schiff made a verbal communication to the Medico-Physical Society of Florence, at their meeting on March 1st, in which he related the results of upwards of five thousand experiments on the differences between anæsthesia produced by chloroform and that produced by ether. With both ether and chloroform, paralysis of conscious sensation, paralysis of the movement of voluntary muscles, paralysis of respiration, circulation, and, finally, paralysis of the heart and the vaso-motor nerves occur. Respiratory paralysis is produced by ether when circulation and blood-pressure remain within the limits compatible with life. Sometimes the vascular pressure increases, sometimes it decreases, but it is always sufficiently high to allow the exchange of the carbonic acid gas with the oxygen of the atmosphere. Vascular succeeds respiratory paralysis when ether is administered. The reverse takes place with chloroform. Frequently an amount of this anæsthetic agent which would not be sufficient to produce respiratory, may suffice to bring on vascular paralysis. Under these conditions, and when vascular paralysis lasts under thirty seconds, artificial respiration is useless, because there is no longer any exchange of gases, the blood-pressure being diminished. The cessation of respiration, therefore, is not the most dangerous moment to animal life, when etherization is employed, whilst it may be so with chloroformization; because sometimes it is possible to produce some automatic respiratory movements, but, nevertheless, respiration ceases immediately, and the animal dies. With etherization, on the contrary, when some automatic inspirations are obtained, it may be taken as certain that respiration will continue and that the animal will live. Professor Schiff affirms that, in the present state of science, there are no means which will show us how to recognise, so as to prevent them, the tendencies which may cause death in some animals, after the first inhalations of chloroform, before having produced true anæsthesia. The reverse occurs with ether; so that it may be said that in the present state of knowledge the surgeon is responsible for the death of the individual by etherization, whilst he is not responsible when death occurs during chloroformization. Professor Schiff, therefore, deduces from these facts the following conclusions. 1. The phenomena relating to the paralysis of sensibility and movement are common to both ether and chloroform. 2. The two other orders of phenomena, that is to say, those relating to vascular and respiratory paralysis, often show themselves in inverse order with reference to these two agents. 3. With chloroform, however, either the one or the other of these two paralyses may first show itself, involving great danger to the animal if the vascular phenomena be the first to make their appearance. Therefore the use of chloroform should be rejected, and ether only be used.—*British Medical Journal.*

Cases treated at London Dental Hospital (April).—The first was that of a man who applied here for the extraction of a tooth; it was removed, and he was dismissed in the usual way without any alarming symptoms presenting themselves; however, for twenty-four hours he had profuse hemorrhage; the following morning he came to have it arrested. On examination it was then bleeding freely; the cavity was mopped out, a piece of lint wrapped up in the form of a cone and size of the cavity, and saturated with the tr. ferri perchloridi, was packed thoroughly down the socket, then a pad or two of lint on the top of it; ordered him to shut his mouth, and then put on a bandage. This was not removed for two hours, which entirely stopped it.

2. This was a case of trismus, caused by an impacted lower dens sapientiæ. The patient was a woman who had been under medical treatment for six weeks, where *poulticing* had been strongly advised at the angle of the jaw. The patient could only open her mouth about half an inch; however, the wisdom-tooth was removed, and she rapidly recovered.

3. This was the case of a man aged sixty, whose gums had receded to a great extent. Patient had syphilis four years since, and had undergone mercurial treatment: several of the teeth were loose; and, as he was still under medical treatment, he was merely advised to use the following mouth-wash two or three times a day:

℞.—Potassæ chlor., ʒj;
Liq. potassæ permang., ʒij;
Tr. myrrhæ, ʒiv;
Decoc. cinchonæ, ad ℥viii.
Misce fiat lotio pro ore, bis vel ter die utend.

4. This was a case of pivoting the right upper central, which was followed with great pain and swelling, extending from the apex of the tooth to the cheek, and implicating the eye, with impairment of vision. On observing that the symptoms of amaurosis became more serious, upon the combined opinion of the staff it was proposed to remove the stump. Nitrous oxide was administered, when it was carefully extracted, and from that time the swelling abated, the pain diminished, and the patient gradually recovered.

5. This was a singular case of a vocalist whilst engaged with his troupe some ten years since, in India, that whilst taking an exciting part which rather compelled him to open his mouth as widely as possible, he all at once (as he described it) had something in the left region of the articulation of the jaw go bang!

This patient asserts that from that period to the present he daily experiences most excruciating pain, coming on more particularly whilst filling his vocation. He was recommended to rub in at bedtime, every night, at the articulation of the jaw, an anodyne liniment composed of:

Lin. belladonnæ, ℥ij;.
Lin. saponis, ℥j.
Misce.

This relieved him considerably.

6. These were different cases of abscess of the antrum, which progressed favorably under the following treatment, viz., injections of

Liquor potassæ permang., ʒij ;
Vinum opii, ʒj ;
Aquæ, ad. ℥vj.

To be used with an equal quantity of lukewam water daily ; or,

℞.—Acidi carbolici, ♏x ;
Glycerini, ʒj ;
Tr. opii, ʒj ;
Aquæ, ad. ℥x.
Misce fiat injectio.

To be used as the former ; substituting in a more advanced stage,

℞.—Zinci sulph., ℈j ;
Vinum opii, ʒj ;
Aquæ, ℥jv.
Misce fiat injectio.

To be used as the others. This, combined with especial attention to the antiphlogistic and constitutional treatment, the patients did well.—*Reports London Dental Hospital, in Monthly Review.*

Cases treated at London Dental Hospital (May).—The first was that of a draper's assistant about thirty-eight years of age, who had applied to some medical practitioner, and from what he had stated the patient became somewhat alarmed, and the following morning he resolved to come to this hospital, where (in his own words) he thought we should be perfectly acquainted with the diseases connected with the mouth.

On examination, in the region of the sublingual gland there was a deep ulcer, full of pus and secretion ; it had gradually increased for a period of six weeks. After thoroughly diagnosing, Mr. S. H. Cartwright (who was one of the officers of the day) suggested that he should try the following treatment:

℞.—Potassæ chloratis, ʒiss ;
Potassii iodidi, gr. xxiv ;
Quiniæ disulph., gr. xx ;
Decoc. cinchonæ, ad. ℥xii.
Misce fiat mist., cujus capiat ℥i ter die.

℞.—Liq. chlorinatæ, ʒi ;
Tr. myrrhæ. ʒij ;
Acidi carbolici, ♏ij ;
Aquæ, ad. ℥ij.
Misce fiat lotio, sœpe utend.

At his next visit Mr. Cartwright substituted for the above mixture—

℞.—Hydrargyri perchloridi, gr. i ;
Tr. cinchonæ, ℥ij.
Misce fiat guttæ. Capiat coch. i.
Parv. in cyatho vinario aquæ ter die.

He was ordered to continue his first mixture as well, but only *once* a day.

Lotio, ℥ij, ut supra.

The patient was decidedly better.

May 29th.—This patient again presented himself, but I think on the whole with no marked improvement. As the patient complained that he could not sleep during the last two nights, I ordered him (in the absence of Mr. Cartwright) to continue his medicines and lotion as before for a week, and should insomnia again occur, to take a draught of the following at bedtime:

℞.—Chloral hyd., ʒi;
Aquæ camph., ℥vi.
Misce fiat mist., cujus capiat sextam partem hora somni, omni nocte si opus sit.

June 5th.—Great improvement both in the appearance of the ulcer and health of the patient; ordered him to continue his treatment. More will be said of this doubtful case.

The second was that of a French polisher about thirty-eight years of age, and who applied here for advice, he having a dreadfully-swollen face, caused by ragged teeth in the upper and lower jaws probably, which had wounded the cheek, causing ulceration and induration to a very serious extent. The patient was a poor, emaciated object, and had endured seven weeks' agony. As this man applied on Mr. Cartwright's day, he prescribed the following, and strongly advocated the removal of the offending teeth:

℞.—Liquor chlorinatæ, ʒij;
Potassæ chloratis, ℈i;
Acidi carbolici, ♏i;
Tr. cinchonæ, ℥i;
Aquæ, ad. ℥viii.
Misce fiat lotio pro ore, sæpe utend.

℞.—Potassæ chloratis, ʒiss;
Acidi hydrochlorici diluti, ♏xl;
Tr. cinchonæ, ℥iss;
Aquæ, ad. ℥xij.
Misce fiat mist., cujus capiat ℥i ter die.

I administered the nitrous oxide gas, when Mr. Pearman (the dresser of the day) removed as many as time and circumstances would permit, considering his mouth could only be opened about three-fourths of an inch. I requested the patient to return the following Monday in order to have a further clearance, which was effected through the energetic exertions of Mr. Marriott (the dresser of the day).

The third was that of a foreigner, who presented an awful appearance, due to abscess of some lower molar stumps, and augmented by his poulticing externally. It was on the point of bursting outwardly, and as Mr. Tomes thought it better to lance it, thereby saving possibly a large unsightly cicatrix, I did so, when nearly an ounce of most offensive pus escaped. I also previously removed the stumps. Mr. Tomes also suggested painting externally the surface with collodion, in order to try and confine the discharge *in* the mouth, by advising the patient to freely rinse it several times daily with water as hot as he could retain. The patient was particularly requested to return and report progress, but I presume he thought he had been tortured enough and consequently would defer it, which he appears to have done, as he never turned up; still, he has been seen by one of the students (Mr. Woodruff) in the street, who informs me that the swelling had almost entirely disappeared.

The fourth was a case of pivoting an upper central for a boy eleven years old. The root was prepared and filled with amalgam, in the center of which was a tube to receive the pin after set. When ready, the tooth was fixed, but for six months or more this lad frequently had an abscess at the apex, which readily yielded to the treatment of lancing and syringing the canal out with warm water, and a few drops of creasote added, cautioning him to discontinue wearing the tooth for a few days. As he came on a Monday usually, that being the day Mr. Charles James Fox is an officer, I brought the matter to his notice, when he suggested that instead of a solid pin being inserted into the tube, it would be advisable to have a hollowed pin, so that on passing this into the same tube any gas that formed could then escape, thereby preventing the recurrence of an abscess. Since adopted it has answered admirably.

The fifth was that of a girl about twelve years old, who applied to have a tooth stopped; on inspecting the mouth, it appeared that she had no centrals or laterals. On questioning her whether she ever had measles, she replied that when two years old she had a severe attack. The conclusion Mr. S. H. Cartwright and Mr. Bartlett arrived at was, that exfoliation of bone with the germs of the teeth had taken place, which occasionally occurred after an exanthematous attack.

The sixth happened to be two female patients, who applied here, as a last resource, for the extraction of some badly broken down, almost crownless, upper molars and wisdoms. These patients had already been to a general hospital and a dentist; at both places they had failed, and declared to them that no one could possibly remove them. On the strength of these assertions, and at the suggestion and wish of Mr. A. Coleman, I undertook one of the cases. Mr. A. Coleman got the patient well under the influence of nitrous oxide and sulphuric ether, when, by the adaptation of forceps designed by him for these exceptionally bad cases, and made by Mr. Evrard, of 34 Berners Street, Oxford Street, I successfully removed an upper wisdom, first upper molar, and a canine stump without the patient having the least idea of what had been done. Had I not used great muscular exertion and had Mr. Coleman's forceps at hand, I feel fully sure that I should *not* have succeeded.

The other case came under Mr. Clover, who similarly administered nitrous oxide and sulphuric ether, so that when well under its influence Mr. Morris (the dresser of the day) carefully, although not easily, removed a crownless upper molar. The patient had experienced no pain during its removal.

I think when your readers are acquainted with the fact that these extraction cases readily yield to our skill and appliances, as well as the building or packing with soft or adhesive foil the distal walls of upper or lower wisdoms, it should act as a stimulus to parents and guardians in sending us students, who, at the expiration of two years, can make themselves efficient, thereby bringing credit not only to themselves, but to this school and to the dental profession generally.

The seventh consisted of different cases of abscess of the antrum, which progressed favorably under the treatment of antiseptic and astringent injections diluted with warm water.

One case was where a woman had applied to a general hospital for the extraction of the first upper molar. A fortnight after, she went to the same hospital for the removal of the second lower molar. Five weeks after the latter she came here with an abscess in the antrum, and pus exuding from the lower jaw, where the lower molar had been removed. She was a poor, emaciated, careworn, scrofulous kind of patient.

After curing the antrum mischief the lower jaw gradually became seriously affected, swelling to an alarming extent, with an escape of a large quantity of pus. By freely syringing the part three times a week with the following the swelling and discharge diminished:

℞.—Chlorozon, ʒi;
Acidi carbolici, ♏iii;
Vinum opii, ʒii;
Aquæ tepidæ, ℥vi.
Misce fiat injectio.

As she complained of getting no rest at night, I ordered her fifteen-grain doses of hydrate of chloral at bedtime, and to continue her tonic mixture twice daily with cod-liver oil. As the mouth gradually closed, being able to open it only half an inch, it was thought advisable to remove the loose first lower molar, after which the swelling subsided and she appeared to slowly recover; still, I expect before her health generally improves she will occasionally pay us a visit.

The eighth was an exciting case we had with a patient whilst under the influence of nitrous oxide and sulphuric ether. The patient was a robust butler about twenty-five years of age, who applied for the extraction of some very bad stumps and broken teeth. On this occasion I administered the nitrous oxide alone, with the usual satisfactory result. As time would not allow the operator to complete the removal of the lot, I told him to return the following Thursday. He came, when Mr. A. Coleman administered the nitrous oxide with sulphuric ether; on his being well under its influence the remaining stumps and teeth were removed. On his returning to consciousness he became violent, shouting and resisting to such an extent as to require five of us to hold him or keep him in the chair. This lasted a minute, perhaps, when he recovered and stated he had been dreaming. His dream pictured to him an idea that he was behind with his work, consequently he was making all the haste possible to get it forward. I remember but one somewhat similar exciting case, and that was at Soho Square, more than two years since. In this case he was a powerfully-built fellow, and had been a warrior. To the best of my recollection bichloride of methylene was administered; still, I would not be positive about that, as it might have been the nitrous oxide alone; however, on his recovering it took half a dozen of us to control him. On questioning him, he stated he had been under a delusion, fancying he had been actively engaged in battle. Perhaps it was as well that both these cases were hospital patients, more particularly as there is generally plenty of assistance at hand. Had these two patients applied to a dental practitioner successively on a Monday morning, he would naturally conclude that he had commenced an exciting week.

The ninth case was that of a fishmonger about twenty-six years of age. This patient nine months since applied at a general hospital with a swollen face, undoubtedly caused by the first lower molar stumps; however, he states that a probe was passed into the abscess, and then he was strongly advised to become an in-patient, as he had a diseased jaw. Instead of abiding by this advice he preferred calling in his private practitioner, who could attend him at home, which possibly might give him a chance of doing a little work during some part of certain days, he being a married man with a family. Whilst being attended he was ordered to poultice externally, which ultimately was lanced outwardly to the extent of an inch and a quarter, or perhaps more.

This man lingered on for seven months and three weeks with a discharge, not knowing what it was to pass a day without pain. Five or six weeks since, he was strongly advised to come here.

He accordingly did so, when, after a lengthened account of his case, which, as you may suppose, was somewhat deplorable, complaining more particularly of the pain he was hourly in, by the counsel of Mr. A. Coleman nitrous oxide and sulphuric ether was administered in order to remove the two lower molar stumps. On this being effected, Mr. Coleman advised him to freely rinse the mouth several times daily with hot decoc. papaver, and return that day week. From that time to the present the patient has been coming to and fro in order to have it syringed out with antiseptic and astringent injections with opium. After attending here three weeks, he could hardly open his mouth an inch, which, on examination, proved attributable to a wisdom about to be erupted on the same side. After freely lancing down to the crown and paying due attention to constitutional treatment, the case did well, so much so that now he is discharged cured.

The last was that of a patient who complained of having suffered excruciating pain in the region of the left upper second molar. On examination with a mirror, one could easily see the cause, which was the wisdom being erupted and pressing horizontally against the neck of the second molar. This had already caused slight absorption of the latter. As the case came under Mr. Gregson's supervision, he suggested the removal of the dens sapientiæ. This was carried out, much to the relief and satisfaction of the patient.—*Reports London Dental Hospital, in Monthly Review of Dental Surgery.*

Salicylic Acid.—In an article written under the title of salicylic acid, and for the *Deutsche Vierteljahrsschrift zur Zahnheilkunde*, by Dr. Ostermann of Brunswick, reference is made to the experiments of Prof. Kolbe. It is said that in consequence of the successful results of the use of salicylic acid in the hospital, he was led to investigate it in its application to dentistry. Dr. Ostermann first communicated the results of his observations at the annual meeting of the Central Society of German Dentists.

The following extract translated from the article alluded to contains some of Dr. O.'s observations concerning the application of salicylic acid to dentistry:

"In cases where the pulps of the teeth are changed through suppuration and gangrene into a foul, disagreeably smelling, gas-evolving mass, it is well known that if they are filled without first restoring them to a healthy condition, periostitis will in all probability result. In such cases I introduce into the nerve-canal dry salicylic acid, and then make a temporary filling, which I allow to remain for several days. In order to make the stopping more secure, I saturate a piece of spunk with an ethereal solution of salicylic acid and with it fill the pulp-chamber. The results in a large number of cases were good. The decaying, offensive nerves in the root-canals become fully deodorized and shrink into a mummified detritus. Such detrital matter can neither by evolution of gas nor putrid secretions irritate through the apical foramen. I will here remark that it may be difficult to effectively introduce the dry salicylic acid into the root-canals. If such be the case, we can have recourse with advantage to a concentrated solution of the acid in ether, which will volatilize in a very few moments. This course will be especially indicated in the molar teeth; in the incisor teeth and pulp-cavities, where cleansing can be conveniently performed, it should never be neglected. After washing the canals with the above solution, we saturate a piece of spunk, place in the bottom, and then fill with any material that may be desirable.

In the treatment of suppurating pulps, dry salicylic acid may be employed with advantage. In erosion and in inflamed conditions of the mucous membrane and jaws, I have applied salicylic acid with success. In stomacace and scorbutic inflammation of the jaws, where the borders and inter-dental papillæ appear degenerated, gangrenous, and are coated with a putrid stringy secretion, I have applied salicylic acid mixed with equal parts of the powdered cassia and cinnamonum with a soft brush. The foul taste accompanying such conditions, also the ill-smelling breath, soon disappear. It may here be added that in every inflammatory condition caused by roots dead or affected by periostitis, salicylic acid will prove an admirable remedy.

Aside from the application of salicylic acid in special cases, I have employed it as an every-day means of purifying the teeth and mouth, with the best results.

For a disinfecting mouth-wash: One part of salicylic acid to three hundred parts of water will be sufficient, or if a stronger solution is required, it may be prepared by adding three parts of phosphate of soda and thirty parts of distilled water to one of salicylic acid. It forms a valuable addition to most tinctures and tooth-powders.—*Wm. Taft, in Dental Register.*

SALICYLIC ACID.—Salicylic acid becomes more soluble in water* and its antiseptic and disinfecting properties are considerably increased by combining it with sulphite of sodium; two parts of the latter and one part of salicylic acid yield with fifty parts of water a clear solution, which, according to M. Rozsnyay, does not irritate wounds and preserves milk for a much longer period than a solution of salicylic acid with sodium phosphate.—*American Journal of Pharmacy.*

THYMOL AS AN ANTISEPTIC AND ANTIFERMENTATIVE.—Herr L. Lewin has lately made some experiments in Professor Leibreich's laboratory, in Berlin, on the antiseptic and antifermentative properties of thymol. This substance, the formula of which is $C^{10}H^{14}O^{1}$, belongs to the benzol group. It forms white crystals of a highly aromatic odor; a solution of one part in one thousand of hot water has a neutral reaction, and is of sufficient strength for all purposes. Comparative experiments with carbolic and salicylic acids showed that thymol possessed much greater power than either of these acids, in arresting fermentation in a solution of sugar after the addition of yeast. The addition of thymol to milk caused coagulation to appear twenty days later than in milk to which a similar quantity of water had been added; and at the end of five weeks there was still an aromatic odor, and no trace of vegetation. While filtered egg-albumen underwent decomposition in three or four days on exposure to the air, albumen to which thymol-water had been added did not present the slightest sign of putrefaction at the end of eleven weeks, and the aromatic odor was still perceptible. Putrid pus treated with thymol lost the fetid smell, and remained in this state until it dried up at the end of about five weeks. Herr Lewin also found thymol to arrest putrefactive change in brain-substance for five weeks. With regard to the effects of thymol on the living animal, Herr Lewin says that a watery solution of one in one thousand has an astringent effect on the mucous membrane; and that three or four tablespoonfuls can be taken daily without inconvenience, with the effect of arresting fermentative changes in the stomach. A remarkable effect produced on frogs by immersion in the solution was total cutaneous anæsthesia. Experiments on artificial digestion indicated that thymol did not in the least interfere with the digestive process.—*British Medical Journal.*

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* Mr. Fred. Toussaint, of New York, informs us that ammonium phosphate increases the solubility of an equal weight of salicylic acid in water and glycerin. Ten grains each of salicylic acid and ammonium phosphate yield with a mixture of two drachms each of water and glycerin a permanent solution; also fifteen grains each of the two former with two drachms of water and four of glycerin.—*Editor American Journal of Pharmacy.*

Bicarbonate of Soda in Toothache.—Dr. Dyce Duckworth contributes a short memorandum on this subject to the London *Practitioner* for April. He was called on to treat a case of very severe toothache, and tried various ordinary remedies, including chloroform and carbolic acid, without any benefit to the patient. He then remembered having read that the pain might be relieved by holding in the mouth a solution of bicarbonate of soda. He at once gave the patient half a drachm in an ounce of water, and, to his astonishment, the pain ceased immediately, and complete relief was secured. He thinks that, as the remedy is so simple and the disease so distressing and often intractable, this treatment may be worthy of notice and of imitation.—*Boston Journal of Chemistry.*

The So-called Third Dentition.—Jos. Scheff (*Wien. Med. Presse*, 1874, No. 47) notes eighteen cases in which the so-called third dentition was dependent upon the retention of one or more milk-teeth in the jaw. Some years later, eruption of these abnormally-retained teeth took place. The permanent teeth, which had remained in the jaw meanwhile, then first made their appearance. If the fact that the earlier set were milk-teeth had been overlooked, it would be easy to regard this last eruption as a third dentition. That this latter was the case Scheff denies. (*Centralblatt*, March 13th.)—*Philadelphia Medical Times.*

Pivoting of Teeth.—The "safety-vent" practice can, I believe, be with advantage adopted in certain cases of pivoting, in many cases of stopping of teeth in which the pulp is dead, and, in the allied cases where necrosis of pulp has resulted from rupture of its nutrient vessels in practice, gives the desirability of saving a tooth's crown by stopping or of retaining a root for pivoting. It seems to me that whenever there is evidence of periosteal inflammation being established, or a suspicion of the formation of alveolar abscess, it is far better to adopt this plan rather than to attempt fang-filling after any amount of dressing.

In carrying out this principle in the case of pivot teeth, the plan I adopted some half-dozen years ago, and have constantly practiced and taught since, is the following:

Having extirpated the pulp and syringed out the root-canal, the bore of the latter is equalized to the depth of half an inch (or less, according to the length of the root), cylindrical bars of graduated sizes being used for this purpose. The root-barrel is then rifled with a small excavator, and a platinum tube (the same as used for lining pin teeth) is packed in with amalgam; the patentcy of the canal and the tube is insured by retaining a piece of pin-wire in them until the tube is fixed in place. The amalgam being set, an impression is taken, the exact direction of the tube being shown by inserting into it a piece of pin-wire. A root treated thus is prevented from further decay. The crown is affixed by a split gold pin, which may be narrowed in one direction if much vent is required. In applying this principle to teeth that have to be stopped rhizodontrypy is performed. A small vent-hole is drilled into the pulp-chamber at a point just below the free edge of the gum; into this hole a pin-wire is passed. The pulp-chamber, with its extensions into the roots, is covered over by a pad of gold foil, vulcanite, or some other cap. The crown is then filled and the wire withdrawn. When there is an amalgam stopping at the neck of the tooth, a canal may be drilled through it; or if a cavity has to be filled in this situation, one end of a wire can be placed in the pulp-chamber, a stopping introduced around it, and the wire afterwards withdrawn.—*Mr. Moon, before Odontological Society of Great Britain, in Monthly Review of Dental Surgery.*

Celluloid Plates.—Please say to the readers of the *Journal* that if, in making celluloid, the casts and matrix are polished with pulverized soapstone sprinkled on and rubbed in with the finger thoroughly, they will have no trouble with plaster adhering to the material.—*E. D. Swain, in Missouri Dental Journal.*

Celluloid.—Dentists are continually writing to the editor, asking if celluloid makes a good, reliable base for artificial teeth. And the editor answers, yes! yes!! yes!!! It makes beautiful and strong pieces of work, both for partial and whole cases; and it should be worked by the steam apparatus. It is so nearly the color of healthy gums that "gum teeth" need not be used. It is very easily manipulated if carefully done. It will not bear as slovenly handling as rubber. The flask should be *very* carefully closed at first, and no attempt be made to compress the celluloid until steam will blow off forcibly by lifting the *valve*, which will occur in twenty minutes after setting fire to the alcohol. The editor finds that celluloid flows very freely if enough of it is used, and if pressure is not made too soon. From three years' experience with it, he heartily recommends it to the profession.—*Editorial in Missouri Dental Journal.*

HINTS AND QUERIES.

Will some one who has used celluloid a long time tell us if he has had trouble from plates warping in the mouth? We have found that they do warp when lying around out of the mouth, but have not observed that they change in the mouth. We have made a great many plates of it, and have not heard a complaint.—M. C. S.

In answer to first query on page 391, July number of Dental Cosmos, I will say I do not deem it absolutely necessary to leave celluloid case under pressure five hours. I have immersed the steam apparatus in cold water immediately after letting off steam, and removed the case in one hour without any bad result. I believe a case is much tougher treated as above than to let it remain in too long, especially where salt water has been used in mixing plaster.—Dr. Wm. Thomas, *New Madison, Ohio.*

Editor Dental Cosmos: Dear Sir,—In the June number of the Dental Cosmos there is a case reported by C. A. N. of a young man who had a drop of mercury put into his tooth to destroy the nerve, and he wishes to know if any one can tell him more about it.

I question very much if it was pure mercury, for various reasons, but if C. A. N. will put into a decayed tooth from a quarter to a grain of the oxymuriate of mercury, reduced to very fine powder, and leave it there for twelve or twenty-four hours, it will effectually destroy the nerve and obtund sensitive dentine.

I am pursuing some experiments with another preparation of mercury, which I believe will do all we require without giving the excruciating pain that arsenic does, and if I succeed I will let C. A. N. and the readers of the Dental Cosmos know more about it.—I am, dear sir, yours faithfully, Edward Gregory, *Cheltenham, England, June* 17th, 1875.

Hemorrhage after Extraction of Teeth.—My plan is to remove the coagula from the socket, syringe with tepid water, twist a piece of lint as near as may be to the size of the root, saturate with carbolic acid, introduce and force it to the extremity of the socket, holding it firmly in position for a few moments. If the bleeding ceases, let it remain twenty-four hours. If it is not efficient in checking the hemorrhage, remove it and repeat the operation.

During the last year, in a case of hemorrhage following the extraction of a lower bicuspid for a lady of hemorrhagic diathesis, this plan succeeded after various others had failed, and when death seemed almost inevitable.—H. J. Royal, D.D.S.

A New Use for Mack's Retaining Screws.—Once in a while a case presents where, all things considered, it seems desirable to extract and return a tooth to its socket. Such a case recently came into my hands. After having extracted a canine tooth and removed a sac, I concluded to return it again to its socket; but not wanting to keep it out long enough to fill the whole root, and not being willing to replace it with the nerve-canal open, I decided to drill out the apex, and make a permanent stopping for it with a Mack's retaining screw. After syringing out the socket with a weak solution of carbolic acid, I put the screw tightly in, and filed it down and burnished it. I then dipped the root in glycerin, and, having placed one-fourth of a grain of morphia on the end, returned it again to its socket.

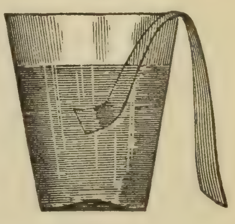
Considerable pain followed, but lasted only about three hours, since which the patient has had no pain, and the tooth is perfectly firm in its socket and entirely comfortable.—A. H. Best, *Savannah, Ga.*

A Method of Gilding without the Aid of a Battery.—Take a gold dollar (or a pennyweight of dentist's gold-foil scraps, which is better than the coin), and roll it through a mill as thin as tissue-paper. Cut this into small pieces, and place in a porcelain evaporating dish. Cover the gold in the dish with aqua regia, and place in a sand-bath. (Aqua regia is made of *three* parts of nitric to *five* parts of muriatic acid. Mix these in a glass vessel, and when effervescence ceases pour into a glass bottle with a glass stopper. It is then fit for use, and should be kept in a cool place.)

Apply gentle heat to the gold thus submerged until it is all dissolved. Increase the heat, and the aqua regia is evaporated, leaving a residue as thick as molasses in the bottom of the dish, and on the sides of the dish there will be a purplish deposit.

Take a quart of rain-water, dissolve therein a tablespoonful of cyanide of potassium, and the same quantity of the ferrocyanide of potassium. Wash out the porcelain dish with a little rain-water, and mix the two solutions. There will be a little effervescence at first, but it will soon subside, and the solution will be a beautiful yellow color. Add a tablespoonful of common salt, filter if you like, and keep in a glass bottle with a glass stopper. The solution is now ready for use.

To gild, take a glass or glazed vessel large enough to hold the article to be gilded, so that it will be well covered on all sides by the gilding solution. Take a piece of sheet zinc twice the size of the article to be gilded, cut in a long strip about an inch or an inch and a half wide. Scrape this clean and bright on one end (the end that is to be in the solution, and which is the support of the article to be gilded), and bend it over the edge of the vessel containing the solution, so as to form a sort of shelf on which to put the article to be gilded, which must be covered by the solution. Clean the articles well by scouring with soap and water, and washing with a solution of soda, so as to remove every trace of oil or grease. Put it on the zinc and into the vessel, and pour on the solution until the article to be gilded is entirely covered. There will soon be seen a deposit of gold all over it. Take it out from time to time, and scour it off in water with a stiff brush charged with chalk or fine sand, and again immerse. Do this several times, until you see that the article has a good coating of gold. Polish with the finest rouge and a soft brush, or, what is better, with a burnisher, and the process is completed.



The zinc will become coated with gold, but this is unavoidable. Each time the zinc is used it should be scraped clean, and the greatest cleanliness is desirable in the whole process. When finished, the solution that was used can be poured back into the bottle, to be used again. Of course the solution will get weaker and weaker as the gold is extracted from it, but the quart will last a long time, and gild many articles with a very pretty and beautifully-colored deposit.—THEODORE F. CHUPEIN, *Charleston, S. C.*

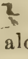
1 MOUNT VERNON ST., BOSTON, July 18th, 1875.

MR. EDITOR,—In the *Boston Medical and Surgical Journal* for the 17th of this month will be found a copy of a dental letter from General Washington, the original of which is now in the possession of some of the Greenwood descendants, who have kindly allowed it to be printed by the editors of the above-named journal, at whose request I made some explanations and comments, which I send to you, as of interest to the profession.

THE LETTER.

PHILADELPHIA, 12th Dec^{r}, 1798.

SIR,—Your letter of the 8th came safe—and as I am hurrying in order to leave this city to-morrow, I must be short.

The principal thing you will have to attend to, in the alteration you are about to make, is to let the upper bar fall back from the lower one, thus, . Whether the teeth are quite straight, or inclining a little in, thus,  or a little rounding outwards, thus, is immaterial, for I find it is the bars alone, both above and below, that gives the lips the pouting and swelling appearance—of consequence, if this can be remedied all will be well.

I send you the old bars, which you returned to me with the new set, because you have desired. But they may be destroyed, or anything else done with them you please, for you will find that I have been obliged to file them away so much above, to remedy the evil I have been complaining of, as to render them useless, perhaps, to receive new teeth. But of this you are better able to judge than I am. If you can fix the teeth (not on the new bars which you have) on the old bars which you will receive with this letter, I should prefer it, because the latter are easy in the mouth—and you will perceive moreover that when the edges of the upper and lower teeth are put together that the upper falls back into the mouth, which they ought to do, or it will have the effect of forcing the lip out just under the nose.

I shall only repeat again that I feel much obliged by your extreme willingness and readiness to accommodate me, and that I am, sir—

You obed^t Servant G^o Washington.

M^r Jn^o Greenwood.

This letter was read at a meeting of the American Academy of Dental Science about five years ago, but has never before been printed.

The letter was written to John Greenwood, of New York, who had a younger brother, William Pitt Greenwood, in Boston, both skilled in the practice of dentistry as then understood.

The "bar" referred to took the place of what is now the plate, and was made of ivory carved to an approximate adaptation to the gum, and the teeth were fastened by rivets to the bar.

At that time neither the principle of complete support by atmospheric pressure nor by springs was well understood, and the support of an artificial set in the mouth depended somewhat on training of the facial muscles.

The bulk or thickness of the bar, together with the action of the muscles in keeping it in place, was apt to give a puffed or "pouting" expression of the face, or some part of it. This in the case under consideration was principally evident about the upper lip, as seen in Stuart's portrait of Washington, painted about 1796, while the subject had the set of teeth, the bar of which he had, being at a distance from the dentist, modified so much with his own hands, to obtain comfort, and if possible to correct the objectionable expression mentioned.

The suggestion in regard to the "falling back" of the upper teeth, though probably not anatomically correct, even at his age, was evidently made with reference to the same point, as an additional aid in diminishing the pouting expression of the upper lip, and in producing the original symmetry of the face which we find in Houdon's bust, made in 1785, and which is also seen in Peale's portraits.

It is gratifying to know that we have in Ball's equestrian statue of Washington, in the Public Garden, a good representation of his natural features, mainly, as I am informed, from Houdon and Peale, and which, being free from the objections mentioned in the above letter, would seem thereby to have the approval, in this respect at least, of the great original.—Jacob L. Williams.

Fig. 1.

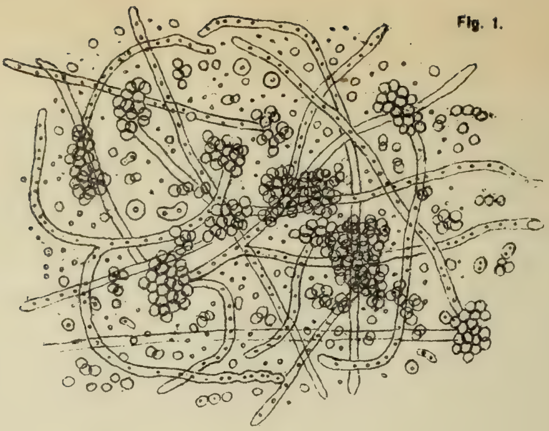


Fig. 1. Oidium Albicans.

Fig. 2.

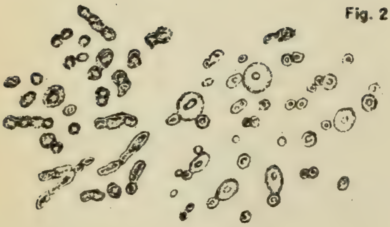


Fig. 2. Cryptococcus Cerevisiæ.

Fig. 3.

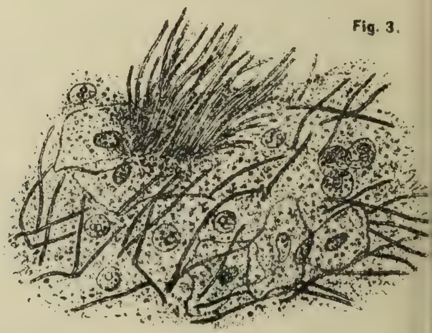


Fig. 3. Leptothrix Buccalis, growing from epithelium scales.

Fig. 4.

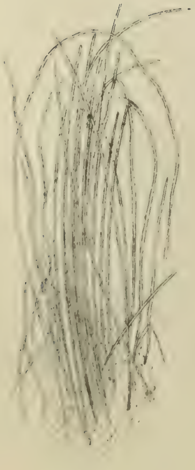


Fig. 4. Leptothrix Buccalis, growing from tartar.

Fig. 5.

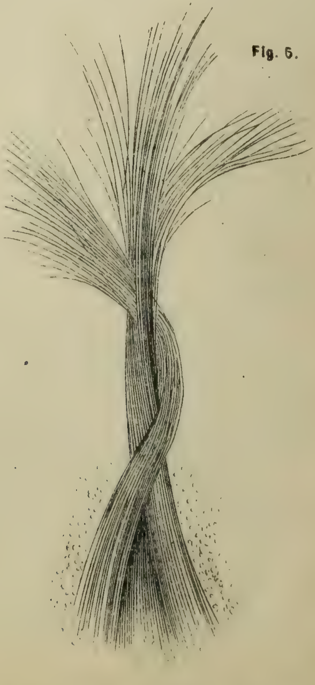


Fig. 5. Leptothrix Buccalis, growing from inflamed mucous membrane.

Fig. 6.

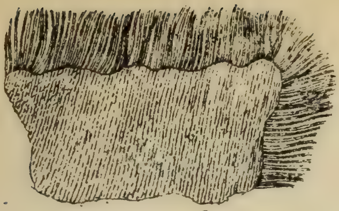


Fig. 6. Leptothrix Buccalis, growing from softened dentine.

Fig. 7

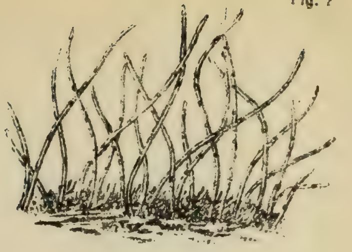


Fig. 7. Leptomitus

Fig. 8.

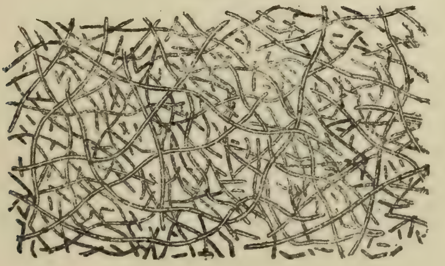


Fig. 8. Leptothrix, Bacteria and Vibriones found in vegetable infusions.

Fig. 9.

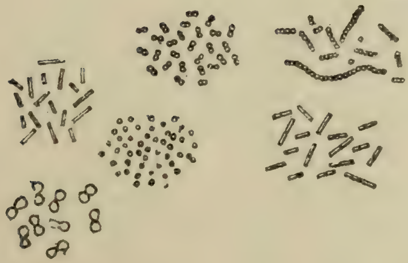


Fig. 9. Bacteria and Vibriones in different stages of development.

Fig. 10.

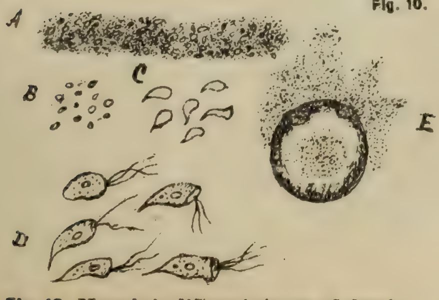


Fig. 10. Monads in different stages of development.
D. E.—As observed and described, only by Dallinger and Drysdale.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

AN ESSAY ON THE LOWER FORMS OF LIFE FOUND WITHIN THE ORAL CAVITY.

BY C. N. PEIRCE, D.D.S.

(Read before the Pennsylvania State Dental Society, July 13th, 1875.)

In the preparation of this essay I shall endeavor to give not only a description of the organism to which has been assigned a prominent influence in the production of dental caries, but also to embrace all of the lower forms of life which the microscope reveals within the oral cavity.

The first, and not an easy problem to be solved in the examination of these minute objects, is their true place in nature. Having decided that they are organic, the next query is, Do they belong to the flora or fauna—plant or animal? The casual observer notes a broad distinction. To him the old definition, "that an animal is possessed of life and locomotion, and a plant of life without locomotion," seems to be sufficient, until, some day, traveling beyond the circuit of his diurnal route, he meets with animals without locomotion (zoophytes), and plants with locomotion (diatomaceæ).

Such an encounter confuses the novice, and his resolve to further investigate only adds to his bewilderment, for similar instances multiply until the evidence produced is so strong that he is compelled to desert his position and seek refuge in the declaration that "one kingdom runs into the other so imperceptibly that no line of demarkation can be drawn between them." Nor does this similarity cease with the external characteristics; so close is the mutual relationship existing between all the vital forces that they may be legitimately regarded as modes of one and the same force; this so-called vital force being evolved within the living bodies of plants and lower animals by the transformation of heat, light, and chemical action obtained from without. Dr. Carpenter states that the "vital force which causes the primordial cell of the germ first to multiply itself, and then to develop itself into a complex and extensive organism, was not either originally locked up in that single cell, nor was it latent in the materials which are progressively assimilated by itself and its descendants: but it is directly and immediately supplied by the heat which is constantly operating upon it, and which is transformed into vital force by its passage through the organized fabric which manifests it." In plants, and in lower tribes of animals, we are able to trace a most undoubted relationship between the vital activity of each individual and the amount of heat which it receives from external sources.

There is, then, good reason for regarding *temperature* as exerting a most important influence in favoring not merely increase in size, but specialization of development. That the rate of growth in plants depends largely upon the amount of light and heat to which they are subject is a familiar fact. By variations in temperature the rapidity of movement of the particles in the cell may be seen to be increased or diminished at pleasure. The amœboid activity of a white blood-corpuscle is similarly stimulated by the influence of heat. We know also that the hatching of eggs and the germination of seeds are likewise hastened or retarded according to the degree of heat to which they are subjected.

Two fundamentally opposite doctrines have been maintained as to the nature of life. Under one or the other of these all the various views promulgated on this subject may be ranged. According to the one school, life is to be regarded as the principle or cause of organization; and according to the other, life is the product or effect of organization.

By many physiologists, *vital* actions have been supposed to be altogether special in kind, to be the peculiar manifestations of the inherent activity of the organized body, and to have no necessary relationship with the physical forces of the inorganic world. Lately this view has undergone an important modification. "*Vital* phenomena, instead of being looked upon as altogether peculiar, were gradually more and more recognized as the result of physical forces which had been transformed or conditioned in various ways by their passage through the organism." And now among many advanced physiologists the same kind of correlation is implicitly believed to exist between the *vital* and the *physical* forces, and between the several vital forces, as we know exists between the physical forces among themselves.

Some there are, however, who still contend that there is such a thing as a peculiar "vital force"; a something which finds no place in this circle of correlated energies. Dr. Lionel S. Beale, for instance, says in his new work on "Protoplasm": "In order to account for the facts, I conceive that some directing agency of a kind *peculiar to the living world* exists in association with every particle of living matter, which, in some hitherto unexplained manner, affects temporarily its elements, and determines the precise changes which are to take place when the living matter again comes under the influence of certain external conditions."

Various efforts have been made to define life. Bastian gives it as "an abstract name for those sets of attributes or force-manifestations of living beings which are usually spoken of as vital phenomena." M. Dumas says: "There is an eternal round in which death is quickened and life appears, but in which matter merely changes its place and form." Bichat was led to define life as the "functions together which resist death." Herbert Spencer defines it as "the continuous adjustment of internal relations to external relations." This is probably the most appropriate statement which can be given concerning the phenomena presented by living things; and the test of this appropriateness must be made by judging just how far it is applicable as an explanation of the phenomena exhibited by the lowest forms of life.

As it is not the purpose of this paper to advance any special theory respecting the origin of life, I leave it with these few suggestions to be carried to more ultimate results by individual minds. All fermentations have until quite recently been supposed to be the result of spontaneous decomposition of organic matter within a fermentable liquid. It was said that in coming in contact with air, this organic matter undergoes a special change, which gives it the character of leaven, and this was regarded as an agent having the power of spreading the decomposing movement. It is true, brewer's yeast had long been well known; the fact of its cellular composition and its organization were familiar; but no relation was recognized between this organized condition and those phenomena of fermentation produced by yeast in saccharine liquids, such as grape-juice or the wort of ale. It was always denied that anything else could be observed in alcoholic fermentation than an operation resembling all those slow decompositions that were classed among fermentations. Alcoholic fermentation, instead of being an exception, is, on the contrary, the very type of the phenomena of which I propose to treat; yeast-cells, far from being unimportant, take an essential part in it, and in all fermentations whatever there occur low organizations, microscopic corpuscles more or less analogous to those of yeast. At least this is the result of investigations carried on during the last fifteen years by several men of science, prominent among whom are Robin, Küchenmeister, Pasteur, Bastian, Papillon, and others, to whose investigations and records I am largely indebted for whatever of value may be found in this paper. The experiments of M. Pasteur and M. Dumas have proved beyond a doubt that in the case of any saccharine liquid exposed to the air, the more or less rapid production of alcohol is always connected with the production of a microscopic plant, consisting of rounded globules, a few thousandths of a millimetre in diameter. "These globules multiply in the fermenting liquid at the expense of the organic matter it contains, and in this way they produce decomposition of the sugar into alcohol and carbonic, succinic, and glyceric acids. These are the four invariable products of alcoholic fermentation. Sugar is the food of the yeast-plant: these products are its excretions." We have seen that the fermentation of sugar yields alcohol. The alcohol, brought in contact with certain substances, can absorb the oxygen of the air and transform itself, by oxidation, into acetic acid. A phenomenon of this kind occurs in wine when it sours, the alcohol contained in it being changed into acetic acid; only the agent in the transformation is in this case a microscopic plant, made up of little elongated globules, some thousandths of a millimetre in diameter, these microscopic cells being the vehicles of the oxygen.

When milk turns sour, that phenomenon is also due to the formation of lactic acid. This proceeds from the decomposition of sugar contained in the milk, the microscopic beings accompanying this change assuming the form of the yeast-plant.

All of these fermentations, and many others similar in kind, participate in the *nutrition* and *development* of microscopic beings, presenting various forms, and known as *vibrios*, *bacteria*, *torula*, *leptomitus*, *leptothrix*, etc. These facts, then, having been established, we must consider that all ferments, as well as the degeneration and decay of vegetable and animal tissue, offer not only a habitat, but greatly stimulate the fecundation and development of myriads of infinitely little *threads*, *filaments*, and *corpuscles*, all cryptogamic plants, and belonging exclusively to the *fungi* and *algæ*.

Now, whence come these organized microscopic plants, which we see are almost inseparable from the alterations of organic matter? Upon this great problem adverse opinions are advanced with warmth, and maintained with experiments and profound reasoning. Yet, with all the light thrown upon it, some believe that these little bodies grow by spontaneous generation; while others assert, and profess to have proved, that they come from germs floating in the air, and universally disseminated throughout the body, by the medium of the circulating fluid. Whichever theory be correct, one fact is certain: these embryonic germs of microscopic beings play an important part in the organized world,—persistent followers of decay, ever-present revelers in disease, lying always in wait to pierce the internal machinery of animals and plants, playing high carnival at the disorganization of tissue in disturbances serious or unimportant.

"Life resists or escapes them, but nothing can contest with them its deserted vesture. The corpse is their natural aliment, and death their chosen laboratory. There these lowest of created things work out their lofty destiny in the eternal drama of renewal of organic existences."

We, as dentists, are more particularly interested in those forms found in the oral cavity of man, and that we may appreciate their influence we need to be familiar with their morphology, the soil which affords them nourishment, and the gaseous medium which surrounds them. No plant can thrive on merely mineral soil, but requires also organic substances; if, therefore, these organisms in the mouth are to develop and multiply, it must be either at the expense of the animal tissues and the surrounding secretions, or of foreign substances taken into the mouth. The great law of *selection* must also be obeyed wherever these organisms are to prosper. "The choice of the locality depends upon the peculiar properties of the soil sought for or avoided by the various species of plants." For certain species seem to thrive best in certain localities. The nature of the gaseous medium in which those in the mouth seem to develop and multiply is rich in carbonic acid, as is the case with all of the algæ accompanying the process of fermentation.

Accumulations of food around and between the teeth, degeneration and disintegration of tissue from improper nutrition or other causes, as well as want of cleanliness generally,—all favor the growth of these organisms. Their development is usually very rapid; the function of reproduction is also very intense. A knowledge of these circumstances enables us to form some general theory for the treatment and control of these low organisms. It is not infrequently that epidemic diseases have been attributed to certain microscopic vegetable parasites; but that this idea has not been generally received the following criticism from Robin will attest. He says: "This whole hypothesis is merely an attempt of medical men to seek the external conditions of the existence of universal affections in the changes of the internal constitution of beings, their atoms and molecules. Should there really be such vegetable parasites discovered in epidemic diseases, they might rather pass for consequences of the epidemic disorders than for the causes of such epidemics."

These restrictions apply with equal force to the organisms in the oral cavity, found as they are wherever there is a vitiated condition of the secretions or a destruction of the tissues, whether it be that of tooth-structure, ulceration of the soft tissues, or degeneration of particles of food,—and it is a question worthy of consideration whether the presence of these organisms might not rather pass for consequences of the disorder than causes. So much for the theory of their origin and development.

I come now to the more practical part of the investigation, and shall endeavor to be as brief as possible in giving an accurate sketch of each variety of organism as it is found in the oral cavity; and in collecting this information I am much indebted to Dr. Frederick Küchenmeister's work on "Animal and Vegetable Parasites of the Human Body."

The following are the varieties, and the order in which they shall be described:—

1. Oidium albicans.
2. Cryptococcus cerevisiæ.
3. Leptothrix buccalis.
4. Leptomitus.
5. Bacteria, vibrios, and monads.
6. Paramecia.
7. Heterogeneous mass.

The first I shall notice is that found in what is called "infantile sore-mouth," or thrush. This affection, though occurring at all ages, is much more common in early infancy, and upon this ulcerated surface, with the aid of the microscope, is found a growth which has been termed

Oidium Albicans, or White Plant.

As revealed to the observer, it seems to consist of thickened epithelial cells, mingled with numerous minute sporules or seeds, from the midst of which long, thread-like, jointed and branching plants arise, mycelium, intertwining with each other.

The question as to whether this vegetable growth is the origin or sequence of the disease has not yet been settled. Prof. Geo. B. Wood states in his treatise on the "Practice of Medicine," that "those who believe it to be the cause of the disease, suppose that its sporules, floating in the respired air, attach themselves to the mucous surface, and under favorable circumstances become developed and propagate. These circumstances may consist in some previous morbid state, changing the buccal secretion from its normal alkaline character to that of acidity, which probably favors the growth of this as of other microscopic fungi." Admitting this to be correct, it does not prove this organic development to be the cause of the disease or contagious in its character, for, so far as I can learn of its prevalence or predisposition, it occurs most frequently in the mouths of persons living in situations where the air is impure and diet unwholesome, or where previous gastric or intestinal disorder has interfered with the health and vigor of the infant. If in the aged, it is where advancing years have promoted the degeneration of tissue and increased the pabulum whereon such growth may prosper.

So it will be safe to estimate it only as a symptom of disease, a natural sequence of a condition, and not a primary cause. This disease manifests itself sometimes in the form of small points, rings, conical and semi-spherical elevations, and also in the shape of large spots.

The external portion or surface possesses a more or less soft cheese-like consistency, and is more or less thick; it adheres more firmly at first than at a later progressive stage, and finally peels off without injuring the continuity of the mucous membrane. It is found alone or simultaneously on the inner edge of the lips, where the mucous membrane begins, on the inner side of the cheek, on the gums and palate, on the upper and lower surface of the tongue, in the throat, and in the œsophagus, down as far as the cardia, or upper opening of the stomach.

CRYPTOCOCCUS CEREVISIÆ—*Cell or Capsule.*

This plant is composed of round or oval cells, which present in their interior one or two little corpuscles resembling somewhat an oil-globule. They are propagated with great rapidity when in contact with decomposing substances at a favorable temperature. Their development is by small projecting bodies on the sides of the cells, which, when they attain the size of the parent, originate new germs, and in this way form a row of from three to six elongated cells, never, however, becoming confluent, so as to form a cylindrical rod or stem. This cryptococcus is so similar to that found in yeast, beer, ale, and sour milk, that it may be considered practically identical, the principal difference noticed being a variation in the size, while in shape, manner of propagation, and apparent globule within, the modifications are but slight. It is developed in the morbid secretions of the mouth, the œsophagus, and stomach ; it is also introduced into these situations by the drinking of beer. On examining the secretions of the mouth when first rising in the morning, it is readily detected in the mucus, saliva, and remnants of food.

In the black fur of the tongue of persons laboring under typhus, or in the oral secretions where persons have been long sufferers from organic disease, it is also found. Küchenmeister speaks of it as being the so-called "cholera fungi" of Swayne, Brittan, and Budd, which they found in the vomited matter of cholera patients. Vogel thinks it of great importance to regard this plant only as an accompaniment and not as the cause of disease—a result of the altered conditions of the fluids, which have assisted its development, but never the cause of this change.

LEPTOTHRIX BUCCALIS—*Slender hairs in the mouth.*

This consists of delicate structureless fibers, of various lengths, and straight or curved as the fiber is long or short. One end is free, the other is planted in or projecting from a fine granular mass, though a limited number are always noticed floating in the secretions, detached from any substance. They are found single or in bundles, and multiply with great rapidity. Scarcely any portion of the mouth is free from them. They appear on the surface of the tongue, in depressions of the teeth, and cavities of decay, on the necks and surfaces of the teeth; indeed, everywhere within the oral cavity that lodgment can be found for a particle of food. The multiplicity of appearances they present would almost lead one to suspect they were of different varieties. You scrape the surface of the tongue when it is slightly furred, and you have presented a mass of epithelium scales, many of which have projecting from their surface straight rods, like bristles from a brush or teeth from the center of a fine-toothed comb. The same appearance is presented when particles are taken from cavities of decay or interstices of the teeth, but when removed from inflamed or ulcerated surfaces of the mucous membrane, or tongue, or débris from the necks of the teeth, the fibers are long, wavy, and curved, sometimes resembling a mass of exquisitely fine hair twisted into cylindrical form, and then spreading out into diverging rays, separating into two or three distinct masses like branches from the trunk of a tree. Again: they intertwine like meshes of a net, crossing each other in every direction, thus modified by locality, environment, etc., presenting dissimilar appearances. In watching for a length of time the free ends of these fibers, a slight vibrating motion is not only discernible, but from these ends small portions are constantly being detached, which resemble the bacteria and vibrios surrounding them, and by many are believed to be the same.

These fibers of leptothrix, as has been remarked, are found in cavities of decay, and not less abundantly where nature has been successful in arresting the progress of caries than in those where decay is rapidly progressing, provided decomposing portions of food are there. They are found also growing from the surface of accumulations of tartar, whether such accretions be upon the necks of the teeth, in the cavities of decay, or on artificial dentures. There is probably no situation where they grow with greater rapidity than on the surfaces of the plate, either upper or under. The soft cheese-like substance that so quickly accumulates there is most prolific in their production, though from this situation they are neither so long nor attenuated as those taken from an inflamed mucous membrane. While great care in cleanliness limits their number, it is impossible to entirely eradicate them or prevent their development.

Any mouth however free from accumulations of food would still furnish sufficient aliment for their development and multiplication from the natural waste of the tissues. *For no sooner does highly-organized tissue wane in its vitality, than its constituent particles individualizing themselves give rise to lower forms of life.* Let me not be understood as speaking of leptothrix as growing exclusively in the mouth, for such is not the case. It is very readily developed in infusions of animal and vegetable tissue when kept at a favorable temperature.

Leptomitus—*Slender Threads.*

This growth, as the name indicates, is neither so long nor so slender as the leptothrix. It also has occasional branches, and marked transverse striæ, which complete its morphological difference from the plant just described. It is found upon the tongue and in the pharynx of persons suffering from pneumonia, pleuresia, phthisis, apoplexia, and chronic gastritis. While it is not so frequently found as leptothrix, there being many situations and conditions favoring the development of the latter where leptomitus does not appear, yet wherever leptomitus is, there we are quite sure to find leptothrix.

Of this plant there are several varieties, varying, however, not so much in appearance as in locality or habitat, and recognized as *leptomitus oculi*, *leptomitus uteri*, *leptomitus epidermidis*, etc.

Bacteria and Vibrios.

These organisms form some of the most minute objects which the microscopist has the opportunity of examining, and it is with the greatest difficulty their structure can be accurately determined. These two varieties we have placed together because they are invariably found in the same solution or infusion, and are developed under similar conditions; their number, size, and the rapidity with which they multiply depending entirely upon the amount of degenerating vegetable and animal tissue, and the temperature in which it is kept. They are both found in the fluids of the mouth, but the profusion in which they exist is modified by the care exercised in keeping the fluids of the oral cavity free from decomposing substances. In the fangs of teeth where the pulps are devitalized they are found to rapidly develop. Nor is their presence in this locality confined to such teeth as have defective crowns giving communication with the fluids of the mouth, but in a number that were examined where there was devitalization of the pulp without any loss of the hard tissues from caries or otherwise, their presence was readily detected. Upon opening into such cavities, they were, as usual, very offensive from the degenerated pulp, and on examining this putrid material these living organisms were observed in abundance. Their presence in these cavities, secluded as they were from any contact with the atmosphere or secretions of the mouth, must be accounted for in one of two ways, viz., the embryonic germs of these organisms must have been carried there through the circulating medium, so that the moment death and degeneration of this higher tissue took place there they developed and multiplied; or else it must be that when the vitality of this vascular tissue is on the wane, its constituent particles are capable, by individualizing themselves, of growing into the low organisms in question.

MONADS.

With these two low forms of life we must associate what are known as *monads*, or, as Bastian calls them, *plastide-particles.* These are invariably found in the same solutions with the former, and are supposed by some observers to result either by direct growth and development, or by aggregation and coalescence into bacteria and vibrios. This latter view was advanced by both Dr. Hughes Bennett and M. Dumas, the former stating that he has actually seen the union above mentioned taking place. Whatever may have been the theories advanced respecting the origin and nature of bacteria, there is yet no clear settled conviction in regard to them.

"Naturalists have been in doubt as to whether they should be regarded as independent living things of the lowest grade, having an individuality of their own, or whether, rather, they should be looked upon as developmental forms of some higher organisms, either animal or vegetable." The four principal views concerning them are as follows: 1. Ehrenberg contends that they are *animal organisms* of the lowest grade, having an individuality of their own. 2. Haller thinks they are of the nature of spores, produced from, and destined again to develop into, some of the simplest microscopic fungi. 3. Cohen thinks they represent a free-swimming stage in the existence of certain algæ. 4. It is asserted that they are the first and most common developmental phase of newly-evolved specks of living matter, which are capable, either singly or in combination, of developing into many different kinds of living things. This fourth and last view has been advanced by Bastian, he believing that they are largely the result of the direct growth and development of what he terms plastide-particles or monads. The bacteria are, as most commonly seen, both straight and curved rod-like bodies, varying in length from $\frac{1}{15000}$ to $\frac{1}{2000}$ of an inch, with a joint or line dividing them into two equal parts. Their movements vary both in rapidity and manner, sometimes oscillating, at others of an irregularly rotating character. They are supposed by many to develop into the leptothrix, which we have found so persistent in the oral cavity. However this may be, any careful observer will recognize their similarity to the short rods which are constantly being detached from the free ends of the leptothrix as they grow in such profusion in the mouth. Cohen (in the *Quarterly Microscopical Journal*, 1873, p. 163) recognizes the surprising resemblance of the microspores of an interesting oscillarian alga crenothrix to bacteria, although he thinks there is no genetic connection between the two. He defines bacteria as "chlorophyl-free cells of spherical, oblong, or cylindrical form, sometimes twisted or bent, which multiply themselves exclusively by transverse division, and occur either isolated or in cell families."

"They make fluids milky unless they have nearly the same refractive index." Their diameter is not more than $\frac{1}{20000}$ of an inch, and their length varies from twice to a hundred times as much. They divide by elongating to double their normal length, and subsequently pinching in, but never branch. Their movements are extremely various. He says, "the systematic place of these organisms is at present purely provisional." Lister believes he has demonstrated the origin of bacteria from a fungus, a species of dematium.

From "Researches into the Life and History of the Monads," by Messrs. Dallinger and Drysdale, published in the *Monthly Microscopical Journal* for May, I make the following extracts:

Five different forms of these microscopical objects have they thoroughly studied, and they name them respectively the cercomonad, the springing monad, the uniflagellate, the biflagellate, and the calycine monad, from what will be seen is its calyx-like form. The biflagellate was the one which first arrested their attention, and for three months almost the only one observed. But at the end of this time the others described appeared simultaneously.

"The observations of Dr. Bastian, Dr. Gros, and some others, alleging the origination of one known form from parents of an entirely different nature, ... are instances which could only be accepted scientifically by tracing the whole process step by step repeatedly, until every stage in the process of mutation was actually discovered and described. The possibility of misinterpretation is great. Indeed, we distrust all observations founded on successive 'dips' in a quickly changing organic infusion, and in fact put no faith in observations of this sort not conducted on the plan of keeping the same drop under continuous observation during all alleged transformations. As far as our observations upon these lowly forms go, we are bound to say that not the slightest countenance is given to this doctrine of heterogenesis. On the contrary, the life-cycle of a monad is as rigidly circumscribed within definite limits as that of a mollusc or a bird. There is no indication of any unusual or more intense methods of specific mutation than those resulting from the secular processes involved in the Darwinian law, which is held to furnish the only legitimate theory of the origin of species."

In alluding to the *sameness* of organisms in all putrefactive processes, they state, if the animal matter exists in sufficient quantity, and the process be allowed to continue for months, "then an immense variety of flagellate forms arise, often wholly extinguishing almost every trace of the bacteria and their congeners, and still the putrefactive process is carried on with great vigor. Hence we are wholly disinclined to believe that the bacteria are the only, or even (in the end) the chief, organic agents of putrefaction; for most certainly in the latter stages of the disintegration of dead organic matter the most active agents are a large variety of flagellate monads.

"We do not profess to decide what is the true nature of the monads we have studied; that is, to decide whether they be vegetable or animal; we, nevertheless, strongly believe in their animal nature. But if this be so, they afford another illustration of the inefficiency of the distinction between the animal and vegetable kingdom, which assumes that animals can only assimilate organic compounds, while vegetables can elaborate their protoplasm from those which are inorganic."

"The first process in the life-history of this monad is, as usual, fission, and the more carefully this process is studied, the more remarkable it appears; for we have here not a uniform homogeneous rod of sarcode like the bacterium, which we can easily imagine by mere growth to elongate and divide by transverse fission, as it is said to do; but we have a creature of distinctly marked shape, a certain amount of structure and differentiation of parts, of which each part appears to generate a counterpart of itself. How long *this* process may be going on we cannot exactly say, but the time taken in *visible* separation is from five to sixty minutes. In every case the division results in two individuals equal to each other in shape and apparent size; a little less in bulk than the original monad, but in every sense as perfect." The authors state that "the general method of fission was made out with the $\frac{1}{16}$, with eye-piece giving 1200 diameters; but the complete *detail* was only successfully compassed by the $\frac{1}{25}$ and $\frac{1}{50}$ of Powell and Lealand, with diameters ranging from 2500 to 5000."

"The future of these minute bodies was carefully followed with the $\frac{1}{50}$, and large numbers developed under examination; the development being distinctly traced in all its stages. First the minute and just perceptible specks appeared to swell, to grow larger in all directions, but they were perfectly inactive." This continued for from two to three hours, when some of them began to have a beaked appearance. Their growth continued from two to three hours, when flagella were acquired.

"The complete life-history of this monad is therefore development from a germ or sporule of extreme minuteness, and on the attainment of maturity multiplication by fission, constantly and for an indefinite time; but the vital power is at intervals renewed by the blending of the genetic elements, effected by the union of two, when both are in an amœboid condition, from which a still sack results, in which germs or sporules are formed, which eventually escape, and again originate the life-cycle."

In reviewing the whole series, then, it is plain that rapidity of increase and multiplication is the prominent feature in the vital phenomena of the monads. Everything subserves this end; but it also appears that the methods by which this prolificness is secured are dependent upon the recurrent blending of the genetic elements from which each species arises.

"Thus it will be seen that in no instance was the continuance of the species maintained without the introduction of a sexual process, a blending of what are shown in the sequel to be genetic elements, and thus going further to suggest caution as to the supposition that *any* organism can be perpetuated by the mere self-division of single individuals."

The discovery of these low forms of life in the mouth is not of modern origin, as we shall see by the following from Leuwenhoek. In 1682, at the age of fifty years, he wrote respecting his teeth, "It is my custom every morning to rub my teeth with salt, and afterwards to wash my mouth, and, after eating, I always clean my large teeth with a tooth-pick, and sometimes rub them very hard with a cloth. By these means my teeth are so clean and white that few persons of my age can show so good a set; nor do my gums ever bleed, although I rub them very hard with salt; and yet I cannot keep my teeth so clean but that, upon examining them with a magnifying-glass, I have observed a kind of white substance collected between them, in consistence like a mixture of flour and water. In reflecting on this substance, I thought it probable (though I could not observe any motion in it) that it might contain some living creatures. Having therefore mixed it with rain-water, which I knew was perfectly pure, I found, to my great surprise, that it contained many very small animalcules, the motions of which were very pleasing to behold. The largest sort of them had the greatest and quickest motion, leaping about in the fluid like the fish called a jack; the number of these was very small. The second sort had a kind of whirling motion, and sometimes moved in the direction of a spiral and undulating; these were more in number. Of the third sort I could not well ascertain the figure, for sometimes they seemed roundish but oblong, and sometimes perfectly round. These were so small that they did not appear larger than a *speck*. The motion of these little creatures, one among another, may be imagined like that of a great number of gnats or flies sporting in the air. From the appearance of these to me, I judged that I saw some thousands of them in a portion of liquid no larger than a grain of sand, and this liquid consisted of eight parts water and one part only of the before-mentioned substance taken from the teeth.

"With the point of a needle I took some of the same kind of substance from the teeth of two ladies who I knew were very punctual in cleaning them every day, and therein I observed as many of these animalcules as I have just mentioned. I also saw the same in a white substance taken from the teeth of a boy about eight years old, and upon examining in like manner the same substance taken from the teeth of an old gentleman who was very careless about keeping them clean, I found an incredible number of living animalcules swimming about more rapidly than any I had before seen, and in such numbers that the water which contained them (though but a small portion of the material taken from the teeth was mixed in it) seemed to be alive."

PARAMECIA.

Having now considered all the growths deemed vegetable found in the mouth, I have still one other organism to describe, as to the true place of which in nature there is no division of sentiment, it belonging undoubtedly to the animal kingdom. I allude to the paramecia, a genus of infusoria. They are only found in the oral cavity in cases of extreme uncleanliness, and though increasing rapidly in infusions adapted to their growth, they are somewhat limited in this situation, owing to the constant changing of the secretions. About fifteen varieties have been described. They have a soft, flexible body, variable in form, though usually oblong or oval, and more or less depressed. In most of them numerous rows of vibratile cilia are noticeable projecting from their integument.

The reproduction of these animalcules is effected in various ways, and not infrequently the same individual would appear to propagate by two or three different modes.

The first is by external gemmules, or buds, which sprout like minute tubercles from the surface of the body, and gradually attain the shape of the parent, soon becoming independent beings, though not attaining their full growth until after their separation.

The usual mode of propagation, however, is by spontaneous fissure, or division of the body of an adult animalcule into two or more portions, each of which is perfect in all its parts. "This fissiparous mode of reproduction is amazingly prolific. Thus, a paramecium has been observed to divide every twenty-four hours, so that in a fortnight, allowing the product of each division to multiply at the same rate, 16,384 animalcules would be evolved from the same stock, and in four weeks the astonishing number of 268,435,456 new beings would result from a continued repetition of the process. We feel, therefore, but little surprise that with such powers of increase these minute creatures soon become diffused in countless myriads through the waters adapted to their habits."

I have stated in the foregoing that the vegetable growths I have been describing belong exclusively to the fungi and algæ; but in which class they shall be placed, or whether wholly in one or the other, seems difficult to determine. In elucidating this subject, I cannot do better than quote a paragraph on "The Mode of Life" of each, from the recent work, "Text Book of Botany," by Julius Sachs.

He says, "The mode of life of algæ is determined and limited by the concurrence of two conditions besides the specific requirements of temperature, viz., water and light. The greater number of algæ are submerged aquatic plants, or when otherwise, they still require water for certain processes of development, especially for their reproduction;

sometimes certain vital phenomena are caused by moistening with water after drying up the cells. Light is a universal condition of the life of algæ, inasmuch as they are all dependent upon individual assimilations in them: as elsewhere in the vegetable kingdom, this is brought about by chlorophyl, which, with the help of light, decomposes carbonic acid and evolves oxygen. Algæ are, therefore, never true parasites, although they very commonly live on the surfaces of other plants." In a note he says, "This proves, however, not to be absolutely true, as Cohen has discovered a chlorophyllaceous alga which is parasitic on lemma. This at the same time affords the only means for a sharp but artificial separation between algæ and fungi. From the section of siphoneæ among the algæ containing chlorophyl to the parasitic phycomycetes among the fungi destitute of chlorophyl there occurs so gradual a transition in their morphological characters that, without the characteristic coloring, the siphoneæ and phycomycetes would have to be included in one group; but the distinction between algæ and fungi would then be at once overthrown. There exists, in fact, as may be concluded from what we have said, no definite boundary-line; but, for the sake of clearness, it is desirable to establish a conventional or artificial one; and this is best afforded by the presence or absence of chlorophyl."

"The mode of life of fungi is in all important features determined by the fact that they are destitute of chlorophyl, and therefore do not assimilate, but are adapted to take up the assimilated carbon-compounds of other organisms. This they effect either by their mycelia absorbing from the ground the partially decomposed exuviæ of animals and plants, or they grow upon or in excrementa, or are parasites; in the latter case they may attach themselves to living plants and animals, penetrate their tissues, and thus kill them or contribute to their further decomposition. In other cases their influence on their host is less injurious; they then cause peculiar degenerations in the plants whose tissues they inhabit.

"The parasitism of fungi runs through all degrees to the greatest extremes; some of them live entirely within the tissues of plants and animals, and some are parasitic on other fungi; since, in consequence of their want of chlorophyl, they do not require light for their nourishment, they may pass through all stages of development in complete darkness, if the escape of the spores of particular processes of growth do not require light, as is the case with truffles and numerous other underground fungi. Some, however, need it for their morphological development, and do not fructify without its influence, while their mycelium, on the other hand, vegetates vigorously in the dark."

From these extracts, representing as they do the opinions of a prominent botanist, it is readily seen that no accurate line of demarkation can be drawn by which we can judge of the class to which the above-described organisms belong, and hence it is that while Robin and Küchenmeister place them with the algæ, others place them with the fungi.

I cannot close this essay without some allusion to the difficulty experienced in properly estimating the microscopical examination of much that is taken from the oral cavity, and how readily an observer may be deceived, providing he is not familiar with the appearance of foreign substances which, from locality and surroundings, are constantly liable to find a lodgment therein. To illustrate, I will enumerate what was found in a mass of material—certainly not greater in bulk than the one-fourth of a grain of wheat—taken from the mouth of a hospital patient. With this débris was mixed distilled water, in order to facilitate its examination. When placed in position, the lens revealed leptothrix fibers, both long and short, and varying in thickness as well as length; bacteria, vibrios, and monads not a few; paramecia not so many, but yet in numbers sufficient to make their presence undoubted; pus-corpuscles in abundance, from exudations from the gum around the necks of the teeth; cryptococcus cerevisiæ from fermentations of food; stellate hairs of the ivy-leaf from a vine near the window of his room had also found a lodgment; fibers of wool from the blanket, with their cortical cells giving them their peculiar barbed appearance; fibers of cotton from the pillows and sheets, with their flat, band-like appearance and thickened borders; while the linen kerchief, in its comfort to the owner, had also given its peculiarly rounded woody fiber, with tapering ends and pits in the walls; while the epithelium scales which had served their purpose were not a few; and last, but not least, were the granules of starch from a repast not long in advance of us.

Such were the contents of a speck of material not probably the $\frac{1}{500}$ part of what remained in the mouth; and to examine it understandingly, recognizing its heterogeneity, and placing each item of this differentiated material where it belonged, was to the inexperienced microscopist a work of hours.

Note.—From my examination of the leptomitus and leptothrix, as well as of other filaments found in the mouth, I am inclined to believe their difference is more in degree than in kind; but this is a presumption that could only be sustained by repeated careful and prolonged investigations.

Another semi-conviction I wish to express is, that the accretion and consolidation of tartar is somewhat due to the profuse growth of leptothrix, by its consumption of the animal and vegetable portions of the deposit, leaving the mineral residuum to adhere to the natural teeth or artificial dentures.

And a third query is in reference to the parasitic nature of many of the growths just described. The assumption that they are all true parasites may wisely be questioned, inasmuch as parasites are defined to be organisms growing upon the living parts of other organisms, from the juices of which they derive their nutriment.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,
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[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the Office of the Librarian of Congress at Washington.]

(Continued from page 397.)

III. THE introduction of some material in a plastic condition, which, assuming the exact contour of the lower portion of the cavity, shall harden in that shape and possess strength sufficient to resist the pressure of ordinary filling.

For many years I have used the dental "*plaster of Paris*" for this purpose, and it has proven an excellent material in many cases.

Possessing the advantage of being entirely non-irritating, it also has sufficient strength to form a basis upon which to rest a filling; but it is objectionable from the fact that in teeth of this *first* class there is always the liability to decay around the edges of the filling, and to frequent fracture of large portions of tooth-structure.

When these untoward circumstances occur, the plaster of Paris is found to be of little or no use in protecting the pulp, as it is comparatively readily broken down by the fluids of the mouth.

In cavities, however, upon the buccal faces of molars especially, where gutta-percha can be used with the prospect of permanency as an outside filling, but where the very absence of porosity in this material might be prejudicial to the pulp, plaster of Paris is an excellent "intermediate."

The mixture of oxide and deliquesced chloride of zinc has been used for this purpose for the past few years (twelve or fifteen), and, with the exception of the want of the characteristic of a certain degree of porosity, there is probably no other material superior to it.

Besides this absence of porosity, which, in some cases (particular reference to which will be made, in place, hereafter), is essential to comfort, it is found that the chloride of zinc solution oftentimes acts as a decided irritant.

To overcome this, it has been proposed by Dr. J. S. King, of Nashville, Tennessee, to mix the first portion of oxide of zinc with creasote, and, after introducing this into the cavity in such manner as to form a thin protecting film over that portion nearest the pulp, to cover this with a portion of the so-called oxychloride preparation.

As I had not used creasote for some time at the period when this suggestion was made, I naturally, in pursuance of the same idea, experimented in this way with oily carbolic acid and oil of cloves.

My success has *thus far* been very gratifying, but sufficient time has not yet elapsed for me to be able to give any reliable data in this connection.

In cavities of deep-seated decay, in teeth which belong to my *second* class, there are likewise but comparatively narrow limits for discussion, for in these we have everything in our favor.

As decay has progressed, we will find that the efforts at recuperation upon the part of the pulp have been in consonance with what might be expected from dynamic conditions; we will find in excavating comparatively good, though softened, dentine; and our line of demarkation between diseased and healthy structure seems well defined.

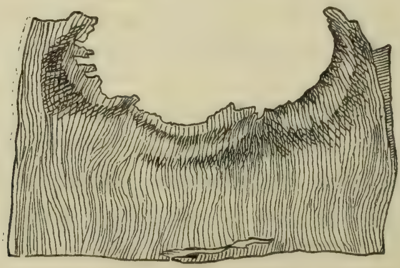
It is in these cases that *less care will suffice* for the accomplishment of good results; *but* it is also in these cases that *every one feels that interest to do his best*, according to his ability, that is ever evoked by the compensation which accompanies effort in conjunction with good material.

Thus it is, that while excavation is not necessarily as cautiously done as in softer teeth, it is, nevertheless, no less felt that injury to such a tooth would be injury indeed.

Thus it is, also, that while such nice considerations as are deemed needful in the treatment of frailer teeth are not thought of here, it is with peculiar satisfaction that such aid and such care as *are* thought proper are bestowed.

The feeling of conscious security, which ever attends the helping of those *who will help themselves*, is the reward of the rapid preparation, the thorough smoothing of the edges, the interposition of some simple non-conductor, as a film of gutta-percha, a piece of quill, a drop of medicated collodion (aconite, morphia, or cloves), or even a piece of thick paper (rendered adherent by gum, tincture, or oil), and the after careful impactation of a good filling.

This interposition of a non-conductor brings us to the consideration of that peculiar process which is known as "tubular consolidation."



The fact that intermittent consolidation of dentine is the concomitant of caries is generally quite apparent, even to the naked eye, in almost every section made from a carious tooth; it, therefore, remains for us, 1st, to consider the cause of this effect; 2d, the probable result which is thus accomplished.

The cause of this effect.—Caries being conceded to be a chemico-vital process, and dentine regarded as possessed of vitality, it seems no longer mere speculation as to the cause of "tubular consolidation," but it is possible to account for it with reasonable exactitude.

The admitted truths that dentine is a vital tissue, that lesions of vital tissues produce irritation, and that irritation, within certain limits, induces increased vital action, are the combination-key to the mysteries of this altered structural condition.

Dentine being merely a living *product*, we have to consider further before we can clearly comprehend the progressive stages of this process.

The dental pulp, in its primary and secondary relations to the dentine, has to be studied; but when it is remembered that this pulp is the remains of that organism from which has been derived the entire dentinal structure, and that the progress of this development has only ceased with what may be termed the completion of the physiological tooth; and when, further, we recognize that this remaining pulp is possessed of a high degree of sensibility, and, consequently, is, in its normal condition, well protected from injurious influences; and, still further, that it is capable, should it be needed, of additionally guarding its integrity by the deposition of "secondary dentine" within the limits of the physiological pulp-cavity; then indeed are we able to draw inferential conclusions with regard to the *source* from whence have been derived the constituents requisite to effect the consolidation which we are discussing.

The *primary* relation which the pulp sustains to the dentine is that of a protoplasma, through the medium of which such material, organic and inorganic, has been selected from the blood as was necessary to impart the required solidity to the tissue which it was designed to eliminate, and, having performed this function, it commences the discharge of that duty which may be termed its *secondary* relation to dentine. This is, the maintenance of vitality, causing, by deposition and absorption, that change of material which we recognize as constantly occurring in every living tissue.

What, then, would naturally be the result of slight irritation of the pulp?

"Irritation," according to its degree, merely signifies an excess of vital action; this is manifested by exalted sensibility, increased circulation, and increased nutrition, these effects being apparent in the irritated organ or tissue.

In progressing caries, the pulp is irritated through the medium of the dentine, and it is, therefore, in this tissue that we find traces of a deposition due to altered action.

By the comparative opacity of that portion of a section of a carious tooth which borders the parietes of a cavity of decay, it is microscopically demonstrated that the change which has taken place is due to an excess of inorganic constituents; but it might reasonably be inferred that such *would* be the case when we reflect that just in proportion as any dental pulp ranks high as a formative organ, and is possessed of strength and energy to seize upon such particles as are indicated for its proper food, so is a structure formed containing so large a proportion of earthy matter as to render it relatively the densest and hardest tissue (except enamel) of which the system is composed.

Advocating the theory that tubular consolidation is a process eminently intended for pulp protection, I present the following suggestions in support of this conclusion:

Whatever vital impressions may be conveyed from external irritants to the pulp through dentine, the inorganic material of the tissue could not be regarded as the medium for this communication, from its evident incapacity to perform such function; an abnormal condition of pulp circulation is, therefore, induced through the agency of the organic filaments contained in the so-called dentinal tubuli; these filaments are conceded to possess every physiological requirement for the performance-of this duty.

The enamel having been disintegrated, and the sub-enamel membrane and exterior portion of dentine, in the pathway of caries, having been so irritated as to warn the pulp of its danger, it seems that an effort of nature is resolved upon which shall diminish the impressibility of that tissue which is now the only remaining protection of its source of vitality.

In erecting its first preventive to irritation at the first *available* point most distant from the excited organ, that excitement is allayed, a healthy condition re-established, and vital action reduced to a normal standard.

This continues undisturbed, until, in the never-ceasing progress of decay, the deposition is, to a certain extent, decomposed, and the vitality of still another portion of the dentine attacked, when all the phenomena attendant upon irritation and increased nutrition are again exhibited.

This seems to be shown, upon examination, as various distinct lines of consolidation are presented, consequent upon a degree of irritation existent in intermediate parts, which precludes the possibility of a deposition within their limits.

The probable result which is thus accomplished.—It has been advanced that tubular consolidation is a protection against the destruction of the tooth-substance, and is thus, in some notable degree, a barrier to the progress of caries.

I cannot incline to this view, from the fact that the only means which would seem potent to effect this end would be either intense solidification like unto enamel rods, or the elevation of the dentine to a degree of vitality which would render it capable of resisting the progress of caries through this agency.

Neither of these results is accomplished, and yet we see in the examples of disintegrating enamel that even an excess in the direction of consolidation would not be so great a "barrier" to the progress of caries as would be the *increase of organic material;* this is demonstrated by the continued resistance of the cemental portion of roots, for a long period after both enamel and dentine have yielded to the progressing caries.

It is, moreover, an aphorism that self-preservation is the first law of nature, and it would, therefore, seem but natural that efforts toward the securing of the integrity of the pulp would first be made.

Admitting this, what process could be more effectual than one which would exclude all vital communication between the irritant and the organ irritated? and what could be more perfectly adapted for this purpose, from all the varied products of the system, than the lime salts which are called into requisition?

Again, we find a maintenance of this condition around the parietes of filled cavities, and in these instances the arrestation of caries cannot be regarded as accomplished, or even materially aided, by this continuance; but there is quite as much necessity for this interposition after filling as before, and in cavities of deep-seated decay possibly even more, for the proper preparation for the introduction of the filling has necessitated the removal of material which, though irritating from acidification, was, nevertheless, in some degree protective from *thermal irritation.*

Instead of this, an excellent conductor of heat and cold has been placed in such position as would most surely entail frequent shock upon the pulp,—shocks which, from their number and severity, would seriously interfere with the normal performance of pulp-function, and which might, indeed, cause death of that organ.

But, as in the case of danger from irritants, concomitant with caries, we have, from tubular consolidation, protection to the vitality of the pulp; so in danger from thermal irritation, concomitant with compactly introduced fillings, we have a continuance of protection from the maintenance of the same consolidation.

(To be continued.)

DENTAL EDUCATION.

No. 4.

BY R. ARTHUR, M.D.

With regard to the extent to which pathology and therapeutics should be taught in a dental college, there are differences of opinion; but it is scarcely to be supposed that any one will attempt to deny that "Operative Dentistry," in such an institution, should receive the most careful, elaborate, and thorough attention. It has, however, been intimated that those who are now advising and contending for a more enlarged theoretical dental education underrate the importance of practical instruction; and it has been said, very truly, that a man may be a learned physician and yet a very poor dentist; but there is no reason at present apparent to me why a medical education should unfit any one for the acquirement of all the manual skill requisite for the practice of dentistry. So far from underrating its importance, I propose to show that if the attention is given to operative dentistry which its importance demands, it will certainly occupy the time and close attention of one teacher, in addition to the requisite number of demonstrators, during the usual winter course of a dental college; and that so far as other subjects are permitted to interfere with it, just so far will it be imperfectly taught.

By the term "Operative Dentistry," is understood that branch which is concerned with all measures that may be employed for securing the regular arrangement of the teeth,—for their preservation, by hygienic and preventive means, and for the treatment of all diseases to which they are subject, or to which they may give rise.

The subject, as above stated, is a broad one, and it is evident that a teacher of operative dentistry means something more than a mere demonstrator, or his equivalent, the recent "clinical professor" of operative dentistry. While a portion of his instructions must be illustrated by his own demonstrations, he has to deal with a great number of general considerations, necessarily embraced in his department.

In examining this subject, I do not propose to attempt to state the exact course or sequence of instruction which any teacher ought necessarily to pursue. I propose to sketch broadly the attention required for the preservation of the teeth. I think it will become apparent—I will, at least, endeavor to make it so—that at every step of his course the teacher of this branch will find that he has to deal with general principles as well as practical details.

The period of gestation is one, it will be admitted, of great importance. Every attention should be given to the preservation of the health of the mother, with special reference to the physical integrity of her future offspring. This, however, is a matter in which we, as dentists, can have but little direct agency. It is with those who have reached an independent state of existence, and are so far advanced in life as to have acquired the organs in which we are interested, that our work begins.

It has been contended that the most important prophylactic measures may be had recourse to before and during the eruption of the teeth, in the employment of food containing a large proportion of lime, thus leading to the formation of teeth of a denser character and better capable of resisting the action of agents producing caries. I have but little faith in such measures. The natural food of infants is rich in this material, and it is contained in abundance in all the animal tissues and in nearly all kinds of food in common use. The formation of teeth deficient in lime appears to be due not so much to a deficiency of this substance in the food generally used, as in the inability of the system to assimilate it to the extent required. If this is the case, no addition to the quantity of lime in the food could be of any service in this way, as, if the system were incapable of appropriating this material furnished, as it invariably is in nearly all the common forms of food, an excess would be eliminated without exercising any effect upon the tissues of the system. Still, this subject, now being discussed, should receive full attention from the teacher of operative dentistry, even if it should only be to show its fallacy. It should be understood, indeed, that an important part of the duties of a teacher is to expose error as well as to present and impress true views.

We come then to the fully-formed deciduous teeth. The subjects which come up for consideration in reference to these teeth are numerous and important. The fact cannot be overlooked that, as dentistry is generally practiced at the present time, but little attention is given to the preservation of the deciduous teeth. But, by common consent among the more thoughtful men in the dental profession, their careful treatment is considered a subject of great importance. This opinion is not of recent date.

It is impossible and unnecessary indeed in this investigation to go into an elaborate statement of what should be taught to a dental class in reference to this subject; it will be sufficient to indicate some of them:—the impressibility of the alimentary tract and the nervous centers in early life; the importance of avoiding all causes of irritation, —in this view the preservation of the deciduous teeth is essential; pain, its injurious effects, under certain conditions, upon the general system, and, in this connection, the subject of constitutional irritation; relations of the deciduous to the permanent teeth; means of preserving them; management of children in reference to dental operations; results of operations; peculiarities of treatment; treatment of pulp of these teeth; importance of its preservation; these teeth as factors of irregularities, etc. It will be seen, by this brief glance, that the subjects which force themselves into this connection must occupy considerable time and attention.

As the period is approached when the important process of the change from the deciduous to the permanent teeth commences, careful attention is required to many considerations looking toward the prevention of irregularities. How much may be done in this way every dentist of experience knows; but it will require clear and systematic explanation to the student to furnish him with an adequate outline of that which it is essential he should know. The immense amount of irreparable injury which has been caused by improper treatment or neglect in applying the necessary remedies at the proper time, renders it essential that the teacher of operative dentistry should not only have clear and well-arranged views upon this subject, but should take all the time necessary to state them fully.

The management of the teeth with reference to irregularities has not yet been developed into a system. Few men engaged in the practice of dentistry have studied this subject; but it must be admitted to be one of great importance. A dentist in full practice, with the heavy tax upon his physical system which this implies, finds it difficult, or satisfies himself that it is difficult or impossible, to do more than to give such attention as he can to cases of irregularity as they present themselves, if he will undertake them at all. This, it must be admitted, is true to a great extent; but it is to be regretted that every dentist in practice should not fully comprehend the importance of the daily opportunities which present themselves to him of recording the results of his treatment, and of making some contribution toward the systematization of such a feature of dentistry as that which we are now considering.

But whatever excuses may be admitted for the ordinary practitioner for deficiencies in this respect, there are none to be found for a man who ventures to assume the position of teacher. With regard to such a subject as dental irregularities, the teacher of operative dentistry must, to do his subject anything like justice, arrange a system for himself. He must carefully study, and be able to explain clearly, the causes of irregularities of the teeth, so far as they are understood; and when we come to look into the subject carefully, it expands to large proportions. It involves a consideration of hereditary influences,—of the influence of disordered conditions of the deciduous teeth in determining the positions of the permanent teeth; of diversions of the permanent teeth from their normal positions without any apparent cause; the relation between the jaws and the teeth; the natural changes which take place during the growth of the jaws; the determination of the important point at critical periods of the development of the permanent teeth, as to whether irregular positions of the teeth will be corrected by the natural changes which may be looked for, or whether some of the teeth shall be removed, to afford room for those which remain; if so, what teeth should be sacrificed,—a matter requiring, in many cases, a great deal of careful and thoughtful consideration.

All these points, and many others not referred to, require attention from a dentist during the early life of his patient, and it is important that clear views should be entertained by the instructor and taught, in order to avert in many cases irreparable injury.

And then we come to the employment of mechanical appliances for the correction of irregularities at any period of life when treatment is feasible. There are certain principles requisite to their success. The methods of obtaining fixed points from which power can be exerted, and the forms of apparatus required for the application of the necessary power and the methods of manufacturing such apparatus. How many of my readers will recall their observations of appliances used for a long period of time, for purposes for which they were worse than useless?

I am aware that there will be found many persons ready to say that this is a subject about which all can be said that is worth saying in one or two lectures. I was once told of a lecturer on sound who ventured the confident assertion that all that physiologists knew of sound in connection with the ear could be written on a visiting-card. But these wise men, in their own conceit, will not be considered by intelligent men as the most competent teachers, and our hopes, faint as they may be, will rather turn to another class mentioned by Solomon in this connection. The best men in the dental profession will agree with my own conclusion, that the subject of irregularities is one which must necessarily occupy a large portion of a course of lectures on operative dentistry.

But while the preservation of the deciduous teeth and the prevention and correction of irregularities are of acknowledged importance, and require a due share of attention, the great work of preservation of the teeth, as it has reference to the entire lifetime of the individual interested, commences with the appearance of those of the permanent set. The period embraced between the commencement of the shedding of the deciduous teeth and the completion of the change is the most important in their management. Whatever system of treatment may be considered best, no one will deny that its early application will bring the most successful results.

Dental caries, as it affects the permanent teeth, is the great subject underlying the whole art of dentistry. To it are attributable all or nearly all the abnormal affections a dentist finds himself called upon to consider. To this subject, therefore, must the teacher of operative dentistry address himself with all his powers. He must take up its treatment in its broadest aspects, and in its most minute details: he must bear in mind that upon the practitioner of dentistry the public relies for protection from the evils of grave character to which they must be subject without his intelligent and conscientious aid. He must bear in mind the fact that every child intrusted to his care has, depending upon his knowledge and skill, a future in this life either of physical comfort or of possible daily discomfort, suffering, and, in no small number of cases, shortening of life. It is this fact which gives dignity to his calling, and should impress upon a teacher the necessity of exerting himself, to the best of his ability, to instruct so thoroughly those he has undertaken to prepare for the important duties of their profession, that they may come fully up to the measure of its requirements.

The treatment of dental caries separates itself into two broad divisions:

1st. That in which entire and unrestricted control is had of the cases from the earliest period.

2d. That in which the service required is occasional, or applicable only after caries has made considerable progress.

The first division of this subject is by far the more important, and involves unquestionably the very highest developments of the practice of dentistry.

It is greatly to be regretted that so little attention comparatively has been devoted by writers upon the treatment of the teeth to the importance of hygienic and preventive measures. The truth of this feature—of paramount importance in the practice of dentistry—should be deeply impressed upon the dental student. He should be made to understand that when, as a practicing dentist, he takes in hand the case of a child, he is highly culpable, if, having unrestrained control, and no extraordinary obstacles present themselves, he permit—

1st. The incisor teeth to suffer with caries of the proximate surfaces to such an extent as to require filling.

2d. If he allow caries to progress so far, in any case, as to lead to the exposure of the pulp.

3d. If he allow one of the permanent teeth to be lost.

The great object of dentistry is the preservation of the teeth as nearly as possible in the condition in which nature has produced them. The man who fails to do this, when he has entire control of a case, is either an incompetent or unfaithful practitioner. He is forced into this dilemma; and neither the public nor the dental profession should excuse him for any delinquencies in this respect. The teacher of operative dentistry who is not able and who does not instruct his class so that every member may be capable of rendering this thorough service, is not fit for his position.

In this connection it must be understood that the high requirements I have stated are only capable of realization by a system of practice looking to the very earliest treatment of the teeth in reference to caries.

If he gives this instruction, it cannot be done without careful and thorough detail, and this means the employment of time for the purpose.

INFLUENCE OF VARIATIONS IN TEMPERATURE AND MOISTURE ON THE TEETH.

BY J. H. M'QUILLEN, M.D., D.D.S.,
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(Read before the Pennsylvania State Dental Society, July 13th, 1875.)

Variations in temperature and moisture are recognized as the most powerful influences in effecting the constant mutations taking place in animate and inanimate matter. That the teeth should be more or less affected by such influences, particularly when subjected to such marked and sudden variations as they are by Americans in the use of fluid and solid articles of food, is but a reasonable inference. Attention has been directed over and again to the injurious effects of the prevalent practice in our country of persons seated at the table with a cup of tea or coffee as near the boiling-point as possible, at least scalding hot, on one side of the plate, and a tumbler of ice-water on the other side, taking at one moment a mouthful of hot tea or coffee, to be followed in a few seconds, or minutes at most, by ice-water, this being continued throughout the meal. To test the exact temperature of ice-water and coffee as found on the breakfast-table, I procured a bath-thermometer; on placing this in a tin coffee-pot in which the coffee had been boiled, and which had been on the table about ten minutes, the mercury rose rapidly to 195°; on pouring the coffee into a cup, the temperature quickly fell to 185°; the addition of cream and sugar reducing it to 160°. At this temperature, although too hot to be taken into my mouth with comfort, I found that others drank it with much satisfaction. Many persons object to the use of cream in their coffee, because it "cools it too much," preferring to drink it as hot as they find it when poured from the coffee-pot. The ice-water indicated a temperature of 40°. The meats and vegetables are also brought upon the table and kept as hot as possible by covered dishes, and in addition to that, to prevent any loss of temperature the plates upon which the food is placed to be eaten from are heated in an oven before being put upon the table.

The food, under such circumstances, is not unfrequently so hot as to burn the mucous membrane of the tongue. A not uncommon practice among young Americans is to order in a restaurant a plate of stewed or fried oysters and ice-cream at the same time, taking a mouthful of hot oysters at one moment, to be followed by one of ice-cream, until they are all eaten. That such sudden changes of temperature cannot be indulged in with impunity to the teeth, and other portions of the alimentary canal as vital organs, seems so conclusive that it would hardly be supposed that exceptions could be taken to such a view, and yet it is assumed by a recent writer in the Dental Cosmos that the results attendant upon such practice are not so injurious as the majority of writers upon the subject are disposed to believe. His views are based upon the following experiment. He dropped a dead tooth into boiling water and allowed it to remain there for some time, and on removing it, found no cracks in the enamel visible to the naked eye or under a magnifying glass of one-and-a-half-inch focus. On bringing the tooth to blood heat and throwing it into ice-cold water there were no cracks ; but on placing it in boiling water and from that plunging it into ice-cold water it cracked badly. He thinks this proves that it requires a change of 160° to crack the enamel of a tooth which had been extracted and was deprived of all its vitality and other sustaining supports and adjuncts. Some sixteen years ago, my esteemed friend Prof. J. Foster Flagg performed a series of experiments,—the first of the kind on record. Taking a certain number of dead teeth, he passed them suddenly from ice-cold water into boiling water and back again, repeating the experiment a number of times. He found no appreciable change in the appearance of the teeth, no checking or cracking of the enamel. These experiments were repeated by me with similar results. Although there was no apparent change in the teeth, I cannot agree in regarding these experiments as deciding, beyond a question of doubt, adversely to the general view in regard to the practice referred to above. On the contrary, recognizing that important results frequently follow the continued operation of slight causes, as, for instance, that water falling drop by drop on the hardest stone will gradually wear a deep hole in it, so the continued indulgence in the use of food with such marked variations of temperature, day after day and year after year, must of necessity be attended by important changes in the structure of the teeth. In addition to this, such rapid transitions must have a depressing influence upon their vitality, and in this way affect them injuriously.* There can be little doubt that dyspepsia, which is so common in our country, may be traced in many cases to the impressions made upon the *semilunar ganglia* when subjected to such decided thermal changes as occur in the introduction of hot and cold fluids in rapid succession into the stomach. Nutrition, under such circumstances, becomes perverted in every tissue and organ.

Several years ago, on a very hot Sunday in July, when the temperature stood 105° in the shade, I noticed at noonday that the iron rails of the street railway opposite my house were so affected by the heat of the sun that they were raised from their beds about four inches in the center of the rails. This was due to the fact that being spiked at each end, the metal in expanding under the influence of the sun was bent in the direction of a bow. In laying the tracks of a railroad, engineers make their calculations in regard to the relative expansion and contraction to which the metal will be exposed in the variations of temperature during the summer and winter months, and therefore leave a slight space between the rails at the ends. The bent rails to which I have alluded were subjected to a temperature, I suppose, of about 130° direct solar heat. If such a marked change as this could be effected upon an iron bar in the course of a few hours by the passage from 76°, summer heat, to 130°, is it reasonable to infer that repeated variations of temperature to which the teeth are subjected in passing from 40° Fahrenheit to 140°, 160°, or 180°, could occur without decided changes taking place in the dental structure? It must be borne in remembrance that the enamel and dentine differ not only in their chemical and microscopical structure, but markedly in density, and when subjected to variations of temperature, this difference in density will be attended by a marked difference in their relative contraction and expansion.

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* See the excellent communication of Prof. J. Foster Flagg on this point in the series of papers on *Dental Pathology and Therapeutics*,. DENTAL COSMOS, April, 1874, p. 169.

Large fillings in the teeth, either of gold or amalgam, must also of necessity be affected by such changes of temperature, and it is reasonable to infer that the loosening of such fillings, in some instances, may be due to the prolonged operation of such causes.

The influence of the variations constantly taking place in the hygrometric condition of the atmosphere must not be lost sight of. Prof. Oliver Wendell Holmes, in directing attention to the dryness of our atmosphere as a cause of disease, says that washerwomen from England and Ireland notice that the clothes, when put out on the line, dry here several hours quicker than they do in their own country. There can be little question that the thin, spare form, the national characteristic of Americans (which is so often caricatured in the London *Punch*), is largely attributable to the dryness of our atmosphere. The appearance of the American is markedly in contrast to the full habit of the English and Irish living in an atmosphere constantly saturated with moisture. The teeth, like the rest of the body, are, of course, affected by these changes in the moisture of the air. Catlin says that it is the custom among the Indians, whether awake or asleep, to breathe through the nostrils, with the mouth closed, and he is disposed to regard the rarity of decay in the teeth of the Indians as largely due to this habit. Of the effects of the variations of moisture, it is only necessary to direct attention to the fact that the upper front teeth decay much more rapidly than the lower,—decay in the latter, indeed, is so rare as to be markedly exceptional. The upper teeth are occasionally covered with saliva and mucus, and at other times perfectly dry, while the lower are constantly bathed with saliva. It is assumed by some writers that the rarity of decay in the lower front teeth is due to the fact that the alkaline saliva in which they are constantly bathed neutralizes the acid mucus. It may be urged, as an exception to the conclusion that a dry condition of the atmosphere exerts a deleterious influence upon the teeth, that the expiratory air from the lungs is constantly loaded with moisture, and that this would prevent the teeth from becoming perfectly dry. Admitting this to have some force, any one who will walk several miles, with the mouth open, will bear testimony to the dry condition of the mucous membrane on any day, but particularly on a hot, dry day. The teeth must be affected to a certain degree at the same time. The cracking and checking of the enamel frequently observed in teeth, are, perhaps, therefore, largely due to the dry condition of our atmosphere, and when this is combined with marked and sudden variations of temperature in the use of fluid and solid food, its effect will be still more evident.

APPROXIMAL DECAY: ITS PREVENTION AND TREATMENT.

BY J. S. RICE, M.D., D.D.S., SHELBYVILLE, IND.

(Read before the Indiana Dental Association, June 30th, 1875.)

In observing the proximal surfaces of teeth that are free from decay, we will usually find that the development of enamel on these surfaces is just as good as at other parts of the crown, having just as much density and smoothness as any other portion; and, if not always as thick as at other points, affording perhaps as thorough protection as it would were its thickness greater, for when softening of this structure has once begun, it is sure to continue until arrested by mechanical interference. No part of a tooth that is kept absolutely clean ever decays. It is in the fissures, and the pits and grooves, and, most of all, in the solitude of the proximal spaces, that the elements of decay lurk and carry on undisturbed the process of destruction to certain consummation.

In these remarks I speak of teeth in the average condition and under ordinary circumstances. I have nothing to say of the ideal dentures that will be developed in the mouths of all civilized people by a few centuries of proper regulation of diet and exercise. This will concern the coming dentist, and need not be considered here. According to the ideas of some gentlemen, all this—expansive dental arches with wide and free proximal spaces—may be brought about in the course of time if an enlightened dental profession will only do its duty. Let us all hope for and work to that end. But, in the mean time, our greatest work is to meet the conditions that constantly present themselves in our practice, and that require at our hands both treatment and hygienic advice. There is perhaps no other condition that gives us more trouble than proximal decay. Those surfaces decay early and they decay late, they decay before filling and afterwards, and the explanation of it all is, as every rational dentist knows, that the secluded position of those parts allows food and secretions to accumulate there and decompose, and, through the evolution of corrosive gases or the formation of other inimical products in direct contact with the proximal surface, tends to its early softening.

The whole subject of hygienic treatment of proximal decay I believe to be embodied in a word, and that is—cleanliness; and that, I think, can be brought about and kept up constantly even in cases where the teeth are much crowded. What if the teeth do not stand apart like the tines of a table-fork? that does not imply that the surfaces cannot be reached. By the means of quill-picks and waxed floss all these spaces can be entered and completely freed from deposit; and if this is commenced early and practiced with sufficient frequency and care, decay will never molest the proximal walls. And the same management will apply with the same protection to decayed surfaces that have been restored by filling, for there is certainly no liability to the undermining of any good filling that is brought flush to the borders of good, sound enamel, and the same kept free from accumulations. I wish to commit myself plainly upon this point, because I have faith in, and have before had occasion to advocate, contour filling. It is through this manner of treatment in these very spaces that we restore the teeth to their original form and usefulness, and instead of chopping down the corners and reducing the countenance of our patient to the saw-toothed visage of a shark, we restore that important element of expression and give back the missing part in the harmony of the features, which treatment is surely more fitting than that which leaves a notched and jagged appearance of the teeth, rendering the poor victim unfit to be seen among men. I refer to the practice of the exclusive use of non-cohesive gold or stuffing.

In preparing cavities for filling on proximal surfaces, no mere routine is to be followed. A wide range exists here for the exercise of common sense and discretion, for it is in the management of this class of cavities, possibly to a greater extent than in any other department of dentistry, that a knowledge of principles and a thinking mind may be made available. Enough cutting must be done to give the cavity a positive retaining shape, and no margin of doubtful strength should be left standing to jeopardize the success of the operation by subsequent crumbling. Yet it is not always necessary to cut away thin walls; in some cases they are so protected and supported by the filling that they are as certain to stand as they would be were they much heavier.

The cervical wall is always a point of solicitude, both in preparation and filling. If not properly prepared no filling can protect it, and if well prepared and the filling be anything short of perfection, decay will undermine it. The first few pieces of gold that are laid against this wall in making a filling usually seal the fate of the tooth for better or for worse; for better if gently yet firmly and thoroughly adapted, for worse if the pieces be clumsily tumbled in or too heroically forced to position; also, weak walls at the cutting edge are prone to crumble if exposed to strain; but if the occlusion will permit, they may in some cases be left standing, and be protected by a portion of gold jutting over against them, but no spur of enamel or thin edge should overhang a filling on a grinding or incising surface.

Retaining points are not always necessary, yet they are very convenient to have around when beginning a filling, and we think it always best to secure one or more, if it can be attained without weakening the tooth or encroaching upon the pulp.

In filling bicuspids and molars, the fissures upon the crown must usually be prepared and filled in connection with the proximal cavity, and in these cases it is often convenient to start the filling on the grinding surface, where a pit may always be easily secured. In separating bicuspids and molars, I usually find it advisable to do so by cutting either with a file or disk; incisors may be occasionally wedged or separated by cotton, and quite frequently their cavities may be conveniently filled and thoroughly finished without any separation whatever, the filling being finished up with a thin burnisher with cutting edges.

I always use the coffer-dam, and in most cases apply it before beginning the preparation of the cavity. I often find rubber dam retaining clamps indispensable, and have never yet seen a case where the rubber dam could not be applied,—that is, in any case where it was desirable to insert a filling.

PROCEEDINGS OF DENTAL SOCIETIES.

THE AMERICAN DENTAL ASSOCIATION--FIFTEENTH ANNUAL SESSION.

First Day—*Morning Session.*

The fifteenth annual session of the American Dental Association convened at Grant's Hall, Niagara Falls, on Tuesday, August 3d, 1875; the president, Dr. M. S. Dean, of Chicago, in the chair.

The usual routine business of roll call and reading of minutes being disposed of, and a partial report of the Committee on Credentials having been made, miscellaneous business was taken up, and several proposed amendments to the constitution, resolutions, etc., lying over from last year, were acted upon.

The first of these, an amendment proposed by Dr. Shepard, giving the Executive Committee the power to change the place of meeting for good reasons, was, after discussion, withdrawn by the mover.

Two others, proposed by Dr. Cushing,—the first making a change in the manner of appointing a Committee of Arrangements, providing for their appointment by the President, instead of being a division of the Executive Committee,—were taken up and passed.

An amendment by Dr. Stockton, providing for a change in the manner of electing officers, was laid on the table.

An amendment proposed by Dr. Allport was then taken up, which read as follows:

> This association will hereafter receive no delegate who shall, after this date, enter the profession without first having graduated at some reputable dental or medical college.

This proposition gave rise to considerable discussion. Dr. Atkinson and others thought it signified a tendency toward exclusiveness, while Drs. Rehwinkel, Morgan, and others thought it did not go far enough; and Dr. Morgan proposed a substitute, which provided that no delegate should hereafter be received who did not hold a diploma, thus going further than the original amendment, which only applied to those who might *hereafter enter* the profession.

Dr. Morgan subsequently, by consent, withdrew the substitute, and the original amendment was then put and carried.

[Local societies sending delegates to the American Dental Association will therefore bear in mind that no person coming into the profession after this date can be received as a delegate unless he be a graduate in medicine or dentistry.]

An amendment, offered by Dr. McQuillen, changing the number requisite for a quorum from fifteen to twenty-five, was lost.

Some resolutions on the subject of "Dental Education," lying over from last year, were then taken up.

One, offered by Dr. Bogue, as follows:

> *Resolved*, That it is the sense of this association that no dental student should be graduated from any dental college without at least three years' instruction; the latter should in no case embrace less than two full courses,

was, after discussion, adopted.

Another, by the same person, suggesting a common committee, to be appointed by the colleges, but disconnected with any of them, for the purpose of examining candidates for graduation and deciding upon the same, was voted down as impracticable.

A resolution on the same subject, offered by Dr. Judd, was taken up and adopted, as follows:

> *Resolved*, That this association recommends to all local societies the adoption of rules prohibiting their members from taking students for a

less period than three years, or for such time as will complete a three years' pupilage.

An invitation to visit certain objects of interest was accepted.

A resolution extending to Dr. Wilson, of Cuba, and any others who might be present from foreign countries, the privilege of the floor, was adopted.

After some further routine business, reports of committees were taken up; but those called not being ready, the meeting adjourned till 7.30 P.M.

Evening Session.

The association was called to order at 7.45, by the president.

The subject of "Physiology" was in order; but the chairman of the committee not being present, it was moved by Dr. H. A. Smith, and carried, that Dr. John Allen be invited to read a volunteer essay upon the subject.

Dr. Allen's paper was upon the subject of physiology as applied to the occupation and health of the dentist.

He alluded to the fact that the duties of the dentist were increased in proportion to the degree of eminence we have attained. No profession more severely taxes the mind, brain, and nervous system than our own, and one hour of the required tension often tells upon the dentist more than would a day of ordinary toil. The temperament of patients often exhausts his vital forces rapidly.

Now, it is important to consider how we may prevent a premature exhaustion of the vital forces. Narcotics, stimulants, exercise, have been resorted to. The more careful we are to observe the fixed laws of nature the more we receive strength.

The human body with its numerous organs and tissues is built up, atom by atom, from fourteen nutrient substances, derived from the food. They are divided into four classes, viz., proteids, fats, amyloids, and minerals. Man introduces other substances which are non-nutrient and detrimental. These are narcotics,—tobacco, alcohol, and opium. They are poisons, but have their places, judiciously used, as medicines; but in larger doses produce narcosis, coma, and death. When only the proper materials in due proportion are introduced into the system, the equipoise of waste and supply is maintained; but narcotics and stimulants do not restore the vital forces. To what is the peculiar fatality in our ranks owing? Is it to the exhaustive nature of our labors, or a course of habits involving the use of these articles? or is it the want of daily exercise in the open air?

We recommend that this subject be brought before the State and local societies, and to place the matter in a tangible shape, the paper closed by the introduction of the following resolution:

Resolved, That a committee of three be appointed, whose duty it shall be to collect facts with reference to the subject-matter here presented, and also the best means of preserving the physical and mental capacity of dental practitioners.

The resolution was put to vote and carried.

[The Chair subsequently appointed as the committee provided for by this resolution Drs. John Allen, W. H. Morgan, and W. E. Magill.]

Dr. McQuillen, chairman of the committee, then read a report on "Sleep, Dreams, and Anæthesia."*

The subject being open for discussion, Dr. Atkinson said that he rejoiced that we were apparently approaching a solution of principles. All that we have had has been a description of conditions. Sleep has not been defined. It has been assumed that we know what it is. Without a definition of it we can arrive at no profitable conclusion as to the difference between sleep and anæsthesia. Can I point out the difference between sleeping and waking? If I should say that it was simply polarization and depolarization, how many would understand me? We are dealing with something not quite so tangible as a stone fence when we treat of a subject like sleep.

There is resident within the organism a demand for a sufficient quantum of power to operate the functions of the body; so long as that demand is supplied and has a credit account in the bank, we are waking. In the practice of medicine he has known no sleep for weeks as generally understood, and has slept in the saddle; is subject to neuralgia, and must have a plus quantity of force in his system not to feel constant pain. These details are difficult to explain to those not familiar with the generation of the elements of tissues. Chemistry is a mere maze of scapegoats to enable us to appear learned when we are the merest blanks. The alphabetical nomination of modes of motion is the only method of ascertaining what physiology is. We must have perception before we can formulate. If we say that sleep and anæsthesia are caused by congestion of the blood-vessels, we show dense ignorance, since we attempt to pronounce definitely upon what we have only insufficient means of determining. *Anæsthesia is death*, in the ratio of its manifestations.

What are poisons? Agents said to act on nerve-centers! What are nerve-centers? The first nerve-center is only a bleb of nervous mass. A human being is only a protoplasm. Oxygen is not a supporter of combustion till set free, and we all know it is then.

Is anæsthesia sleep? A kind of sleep. What is the difference between sleep and death? One is a depolarization forever; the other is only temporary, and is not so in relation to breathing. If we slept all over at once, we would die all over at the same time. How does the heart get along? Does it sleep? and do the lungs sleep?

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* This paper will be published in whole or in part in a future number of the Dental Cosmos.

Dr. McQuillen. The theory that the blood-corpuscle consists of a vesicle or cell wall with fluid contents, as stated by the preceding speaker, has long since been abandoned by the majority of histologists. It is now generally regarded as a soft-solid substance. The heart and lungs do sleep, rest, or recuperate. They sleep in the regularly recurring intervals between the beatings and the respirations. Place the ear over the chest, and two sounds made by the heart will be heard,—a long, dull sound, and a short, quick sound, followed by an interval of repose. The heart rests or sleeps six hours out of the twenty-four. If it be assumed with Dr. Snow, that anæsthetics do not act directly upon the nerve-centers as a poison, but that anæthesia is due to privity of oxygen, it must follow that the inebriate reeling through the streets is not drunk, but is only suffering from privity of oxygen. Shall it be said that sleep is caused by privity of oxygen? Why, during the waking period the quantity of oxygen consumed in the act of respiration is far in excess of that used during sleep. It is difficult to define what sleep is. The brain fails to comprehend and language fails to express these subtle physiological principles. We can only describe phenomena; their causes often lie too deep for the mind to grasp. Physiologists discover, as did Columbus sailing into unknown seas. Scientists working in new fields are liable to make mistakes,—but blunders sometimes lead to success, though often not in the direction intended.

Dr. Atkinson. It *is* privity of oxygen, and nothing else, which makes these men drunk. Don't let us call things by the wrong names. NO is almost always NO^2, and whatever amount of this may be inhaled satisfies the affinity of the blood-corpuscles for oxygen. Even when in cylinders, the very purest that can be made, it contains NO^2, and do not let us be fooled into believing anything else. When it comes into contact with a blood-corpuscle it is satisfied, and then there is effete matter. This is the foundation of many diseases, such as tubercle, etc.

Dr. Magill. The practical questions to be drawn from these papers are: What induces insomnia? Is it mental excitement, or the tension under which we labor? We are all conscious of exhaustion, and Dr. Allen opens a practical view of the subject. We should seek the remedy in relief from excitement. We should discuss whether sleep is the withdrawal of blood from the brain; if so, a remedy which has been suggested for insomnia, namely, eating, to induce a flow of blood to the stomach, and consequent withdrawal of it from the brain, may be founded in reason. We suffer from extreme exhaustion, and anything which will bring us to understand the causes of, and so prevent our trouble, will be better than any remedy.

Prof. Flagg. Practical results are what we want; unless something practical can be drawn from these papers and discussions, no tangible result will be reached. Sleep is an extended subject, and the speaker had done a great deal of it in his time, and expects to do more, and feels competent to discuss it. (Laughter.) In that part of his remarks which I could understand, Dr. Atkinson seems to have struck near the mark, and it is natural for me to infer that the still larger portion that I could not understand was still sounder. (Laughter.)

Sleep is the desire on the part of the organism for further life. As it is deep and strong it is recuperative; as it is short, slight, and disturbed, it is dissatisfying. It is our duty to recognize that we become exhausted mentally, physically, and, we may almost say, *morally;* we ought to go to bed early and sleep enough Don't get up early and work till night over the chair, and then go into the laboratory till midnight, and then go to reading up. The speaker had become entirely prostrated by hard work and reduced to one hundred and twenty pounds; he had changed his mode of life, living eight miles from his office, and never going near it on Saturdays (thus doubly fulfilling the Biblical injunction, which only commands one day's rest), and by this change, and eating the best food he could get, and sleeping eight hours every night, had increased his weight to one hundred and sixty pounds.

Anæsthesia is death! Because it does not prove fatal every time, do not let us think that it is not harmful. It sows disease; it produces a condition favorable to such diseases as chorea and other nervous affections, which will unfit for business, society, or any of the active duties of life. The asylums are full of cases of these diseases. The victims will tell you that from the time of taking ether they began to have their symptoms; first a little irritation of the muscles of the throat, then barking, and then twitching. Men are innocently (rather than ignorantly) swung down to the jaws of death and back again. We have to do it, but it is little less than death. The patient is never the same after. He knows of what he speaks, for he has administered anæsthetics from three to five times a day for twenty years, and every time he did it he trembled for the patient under his care. The effect on himself was fearful—insomnia, nervous irritability, etc.—until he abandoned it.

Prof. Taft wishes to emphasize the expressions of Prof. Flagg. It is an important subject and a serious question. A large number of the profession are in the constant habit of using anæsthetics; many use mostly nitrous oxide. If the influence specified is liable to occur to the patient, how must it be with the operator who is constantly administering it? Prof. Flagg tells his own story; the speaker knows of instances where the health of operators has been injured. This accounts for the cases of insanity. The exhausting nature of the work does not all depend on prolonged effort, but is largely due to incompatibility between operator and patient. One individual will exhaust the strength more in an hour than another will in a day. The strength and mental energy are taken away in such cases, but in others they are apparently increased. He refuses to operate for some patients on that ground alone.

Dr. Rehwinkel bears testimony to the truth of the statements of Profs. Taft and Flagg. He formerly served a term in the penitentiary (laughter), and while there looked upon chloroform as harmless as water. It was in 1847 and 1848, and the Government had given orders that the new agent should be thoroughly tested. The anatomical students were in want of material, and it was hinted that no responsibility would be incurred in case of accident. The consequence was that not a hair was pulled out without chloroform; cases were hunted up among the convicts, who were ready to submit, it being a pleasing variety to them. He had come very near expediting many patients to the happy land. The more he used the agent the more he became afraid of it, and for the last ten years had only consented to use it in cases where the chances of life and death were almost evenly balanced.

He spoke of a singular case in Germany: a gentleman of a poetic nature having read of the stimulating and exhilarating effects of ether, procured a bottle, and putting himself under its influence, experienced results similar to those arising from hasheesh-eating; he continued its use, but did not find a recurrence of his delightful visions. He became, however, a confirmed ether-taker, consuming as much as two pounds a day; he expended his means to procure ether, and when he had no more he became the terror of druggists. He would buy it or beg it, and would have stolen it if he dared. He was finally admitted to a hospital, and a test made to see how much it would take to place him under the influence of ether; with an improved inhaler, which allowed no air to enter, six and three-quarter ounces were consumed before he was partially etherized!

Adjourned.

(To be continued.)

NEW JERSEY STATE DENTAL ASSOCIATION.

This association held its fifth annual session at the Ocean House, Long Branch, commencing Tuesday, July 6th, 1875; Dr. George C. Brown, of Mount Holly, presiding.

The president, in his address, spoke favorably of the law regulating the practice of dentistry in the State; no fault has been found with its practical operation. He also spoke very favorably of celluloid as a base; considered that it was fast superseding rubber, and that any dentist who used it carefully and intelligently would never go back to rubber. He recommended the passage of a by-law prohibiting any member of the society from receiving a student for less than three years, and making it obligatory that he should attend the courses of lectures and graduate at a dental college. He favored the adoption of a rule by the society that, after three years, it should refuse to receive any person as a member who had not complied with these conditions.

Drs. T. B. Welch, C. S. Stockton, J. R. Goble, J. Hayhurst, E. F. Hanks, and L. H. De Lange read essays, and Drs. Perrine and Abbott, of New York, addressed the association.

Ten practitioners were elected to membership in the association.

The following were elected officers for the ensuing year:

President.—Dr. C. S. Stockton.

Vice-President.—Dr. J. W. Scarborough.

Secretary.—C. A. Meeker.

Treasurer.—W. H. Dibble.

Executive Committee.—Drs. L. H. DeLange, A. W. Kingsley, J. R. Goble, J. C. Hanks, and T. B. Welch.

Board of Examiners.—Drs. J. Hayhurst, G. C. Brown, C. Dippolt, C. W. Meloney, and E. F. Hanks.

Adjourned to meet at Atlantic City, the second Tuesday in July, 1876.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE eight annual meeting of the American Academy of Dental Science will be held in Boston, on Monday, September 27th, 1875, at ten o'clock A.M.

The annual address will be delivered by Dr. Robert Arthur, of Baltimore. Essays will be read by other distinguished members of the profession.

E. N. HARRIS, *Corresponding Secretary,*
579 Tremont St., Boston.

EDITORIAL.

THE ANNUAL CONVOCATIONS.

WE present in this issue the first installment of the report of the proceedings of the American Dental Association. The report will be continued in the succeeding number, and the transactions of the American Dental Convention, now in session at Long Branch, will also be presented.

OBITUARY.

DR. U. D. TAYLOR.

DIED, at Fort Madison, Iowa, Thursday, June 17th, Dr. U. D. TAYLOR, aged thirty-seven years.

R. M. GAGE, D.D.S.

Died, in New York, July 26th, of pleuro-pneumonia, Dr. Richard M. Gage.

Dr. Gage was born in Bedford, N. H., December, 1821. Five years of his pupilage were spent with the venerable Dr. Joshua Tucker in Boston, after which he removed to Mobile, Ala., where he pursued the practice of dentistry nearly twenty-two years. Subsequently he graduated from the New Orleans Dental College; then went to Paris, where he practiced with his brother, the late Dr. Edward Gage, who had acquired a reputation as one of the leading dentists of Europe. He remained in Paris five years; then removed to New York, where he resumed professional duties.

Dr. Gage was an Associate Fellow of the American Academy of Dental Science of Boston; a member of the New York State Dental Society; also a member of the Odontological and First District Societies of New York City, of the latter of which he was the recent president.

An earnest lover of his profession, he labored for its advancement, and won the esteem of his many associates.

As a companion, amiable and warm-hearted; as a friend, faithful and considerate; an honored and respected citizen; a conscientious Christian gentleman. Such was his life.

C. E. F.

PERISCOPE.

Dentistry.—Those professions which are half trades also, such as pharmacy and dentistry, present always very puzzling problems to the legislator and the publicist. They have at least two sides and two orders, and yet the temptation of the best men is always to treat them as if they had only one. The difference between a tradesman and a professional man, in the aspect of relation to their respective clients, we suppose to be, that one renders for a fee services on which he puts a price, and the other sells for a sum a thing which has an intrinsic value and a market price mainly irrespective of the vender. In the one case, it is the man who forms the chief element of consideration; in the other, it is the thing. Thus it is with the druggist; who, however, justly often claims a fancy price for what he sells, on the score of his personal skill in selection, scientific acquirements, and reliability; and with the dentist, who on the same score, likewise, commonly claims a professional status and method of payment. Moreover, druggists keep shops, and, as a rule, dentists do not; in fact, no high-class dentist does. But, on the other hand, there are a large number of druggists who must keep shop, and sell at a small profit and no more; and many dentists who must, if servants and poor people are to have artificial teeth cheaply, as they ought to have, just sell the cheapest set of mineral teeth with vulcanite plate at the lowest price at which they can be manufactured, and trust to a large business to make up small profits by quick returns, and "a large turn over." How are all these to be brought within the range of "professional ethics"? To be told that they must not advertise, must not attract by a show-case or well-made teeth marked at cheap price in a shop-window! Why should not dentists advertise as well as druggists? Teeth ought to be stopped cheaply, made well, and sold cheaply; for at present artificial teeth are too much the privilege of the wealthy, whereas they ought to be within the reach of the laborer, or the servant, or the smallest shopkeeper, if trade principles can be honestly applied to cheapen them. This is, of course, heresy to the Odontological Society; and it is natural and right that it should be, for the higher walks of dentistry enter the domain of surgery; and there are points where the ground is common, and men who have a plot in both. But, on the whole, it seems unlikely and undesirable that dentistry can ever become wholly a profession, although it certainly ought not to be wholly a trade. We presume that, under Dr. Ackland's definition, it will remain a "business."—*British Medical Journal.*

SURGEON-DENTISTS.—Sir,—As a member of the medical profession practicing a specialty, which, in its highest bearings, apart from its more purely mechanical point of view, should not acknowledge any inferior position when undertaken by fully qualified practitioners, I feel bound to refer to an article, which has only just come under my notice, which appeared in your *Journal* of the 26th ultimo. It is one calculated to give much pain to those who have really worked for the good name of their profession, though the men of the highest education would be the last to deny the elements of truth which exist in the article in question, inasmuch as they have reference to a class with whom they could not consider themselves connected in any way.

Firstly, as a member of the Royal College of Surgeons and a teacher in one of our best-known general hospitals, I would ask whether, if your interpretation of the social status of dental surgery be correct, I have any right to retain my name upon the college roll, or to remain on the staff of a hospital, all the members of which consider themselves professional, not business men.

Secondly, your remarks only seem to apply to men of such an inferior type that it would be found that, whilst none of them are fully qualified, few of them even hold the special degree of Licentiate in Dental Surgery, which also, by the by-laws of the College, would prevent them from acting in that way which you seem to think to be inseparable from the practice of dentistry. If you will only recall the names, past and present, of the more worthy members of this specialty, you may find men who, in general and scientific acquirement, can rightly claim a position professionally and socially equal to that of the most respected in any branch of surgery.

No one feels more acutely than myself any blots upon the escutcheon of my calling; but, in the name of all qualified and high-minded men in my profession, I disclaim all connection with such a class as you describe, and shall ever hold that, with equal degrees and equal education, a surgeon, whatever may be the branch to which he devotes his attention, holds the same status as any other member of the profession.

As a lecturer also in a special hospital, I have ever impressed upon my students how inseparable is the subject of their studies from general medicine and surgery; for the teeth are organs no more isolated from the body than is the eye, the stomach, or the ear; whilst I have explained to them that they must not expect to be conceded like privileges with, unless they meet upon a common platform as regards all that which makes, the surgeon.

At the same time, I cannot but think that some attention to abnormal conditions of the teeth would repay every practitioner; for very many surgical diseases are intimately connected with such conditions, whilst some of the most persistent cases of neuralgia may be dependent upon morbid conditions of the dental tissues, quite irrespective of caries: the pressure of an osseous excrescence upon the pulp, its ossification or hypertrophied cemetum, often being the *fons et origo* of sufferings which have marred the happiness of a lifetime, and baffled the utmost skill exerted in behalf of their alleviation; for in such cases no drugs, but only a correct appreciation of the cause, can effect a cure. In this malady alone, I am confident that there is a vast field of investigation open in its connection with occult abnormalities of the dentinal tissues, whilst I firmly believe, and my opinion is based upon facts observed by myself, that the day is at hand when the necessity of stopping or extracting a tooth will be looked upon, to a certain extent, as a confession of failure in treatment; for, under favorable circumstances, much may be done to arrest the ravages of decay by suitable constitutional means.

The last paragraph of the article which I am criticising is hardly worthy of comment. The poor, if there be a demand for it, can find aid in this specialty, even as the denizen of the lowest purlieu can, if he so desire it, obtain medical aid at his own price, and be independent of gratuitous assistance. Had not this paragraph appeared in your *Journal*, to which I have long been a subscriber and a thankful recipient of the valuable information to be obtained from it, I should have thought that it was written by an unqualified specialist, who, with no true social or professional feeling, fancied that he saw a greater chance of aggrandizing himself by rendering a branch of the noblest of professions a mere "business."—*S. Hamilton Cartwright, Prof. of Dental Surgery at King's College, in British Medical Journal.*

Dentistry.—We publish in another column a communication from Mr. Hamilton Cartwright, with reference to a brief note which we published lately on the subject of the two classes in the dental profession. The letter expresses, apparently, the opinions of some others besides the writer. Mr. Hamilton Cartwright bears worthily the honorable name which he inherits, and he probably speaks accurately the sentiments of the higher class of dentists with whom he is socially familiar. We are well acquainted with his sentiments, and we respect and to some extent share them; but we do not see that he shakes the main propositions which we suggested rather than urged. Briefly, our proposition is, that dentistry is a "mixed" occupation, partly a profession and partly a business. The professional part of dentistry consists in the surgical care of the diseases of the teeth. The business or trade part of dentistry consists in the manufacture of sets or portions of teeth. The dentist who is a member of the College of Surgeons partakes of the double character, first, of the surgeon, and second, of the surgical-instrument maker; and the larger part of his business commonly consists of the latter. If the surgeon-dentist aspire to be purely professional, he might, perhaps, intrust to other hands the second part of the avocations which are at present combined. We do not know how far this would really ultimately be desirable or possible, but the suggestion serves to explain more fully our meaning. We are, of course, well aware of the claims to social and professional respect of many of the best-known members of the dental profession ; but that does not touch the argument. The practical bearing of the matter is, that the attempt to force a professional character upon trade proceedings only varnishes and gilds the facts. Beneath the veneer, as beneath all veneer, there is apt to be a good deal of unsoundness. The professional part of dentistry would possibly be more wholly and generally conducted with the required professional safeguards, and more easily regulated on a purely professional basis, if it were separated from the trade element; and the trade part of the business would possibly be more soundly, cheaply, and efficiently done if it were released from its quasi-professional fetters, done on a large scale, superintended and conducted with a view to rigid economy and soundness, and made more universally accessible in a reliable form. Good and cheap mechanical is as much a desideratum as highly professionally skilled dental surgery. We should be glad to have the views of Mr. Cartwright and his colleagues on that aspect of the question. We trust that it may not be thought that there is here anything which can be offensive to the many highly cultivated gentlemen to whom the professional aspect of dentistry is that for which they most highly value it, and that to which they would always cling.—*Editorial in British Medical Journal.*

THE RECENT DENTAL EXAMINATION.—The fact is on all accounts satisfactory, that at the last examination for the dental diploma of the Royal College of Surgeons, thirty candidates presented themselves.

It proves first, that the diploma is increasing in estimation among a large number of dental practitioners. It proves secondly, that although we are in a transitional condition as a profession, there is a very general desire for a higher standard of educational efficiency than that with which we have hitherto been satisfied. And thirdly, it shows that those who have not the dental diploma themselves are still sufficiently aware of its value at the present time, and the absolute necessity for its possession in the future, to see the advisability of enabling their sons and pupils to take a degree which they have themselves, by some accident, not been able to obtain.

Still more satisfactory is it to observe that the average efficiency of the candidates has very materially improved, so that as against sixty per cent who were accepted in January of this year, we have ninety per cent. passing to the satisfaction of the examiners on the 22d and 29th of last month. We are committing no breach of confidence either when we state that the examiners were most favorably impressed by the general excellence of the written papers and the *viva voce* answers of the candidates.

Still, it should be borne steadily in mind that we must never rest contented until the *preliminary examination in arts* is made compulsory, for dental as well as general medical students. By demanding a higher educational standard in the first instance, we improve (with the most absolute certainty) the entire body of future practitioners, both as to professional efficiency and social position.

If it be true, as the *British Medical Journal* asserts, that dentistry is still only " a business," then it is well for us to recognize the fact, and by our earnest work of progress now make such a statement impossible of truthful utterance in the future.—*Editorial in Monthly Review of Dental Surgery.*

London School of Dental Surgery.—The following questions were set at the recent examinations. June, 1875. *Dental Anatomy and Physiology, Human and Comparative.* (Lecturer, C. S. Tomes, Esq)—1. Describe briefly the structure of dentine and vasodentine. 2. Of what parts do enamel organs consist? Which of these parts are most essential, and what becomes of each part? 3. What is meant by (1) "adaptive modification"? Illustrate your answer by reference to the dental apparatus of snakes. (2) "Representative species?" Illustrate your answer by reference to the dentition of any animals which may occur to you. 4. Give examples of teeth which are applied to purposes other than the preparation of food. 5. Define "incisors," "canines," "premolars," and "molars." Why is it impossible to frame perfectly satisfactory definitions of these several kinds of teeth? 6. In what manner, and at what period, do the tooth-germs of the permanent teeth originate? 7. What are "diphyodonts," "gubernaculum," "lines of Schreger," "alveolo-dental membrane," "Nasmyth's membrane," "Huxley's membrane"?

Dental Surgery and Pathology. (Lecturer, S. H. Cartwright, Esq) —1. Describe, and give the treatment of, various diseased conditions of the dental pulp. Give the indications, general and local, for preserving or destroying it when exposed, explaining the operations undertaken for either purpose, and the subsequent treatment of the tooth. 2. Give *general* rules for the surgical treatment of the *temporary* teeth in anticipation of possible irregularity in the second denture, and of the *permanent* teeth when irregularity has occurred. Illustrate your answer with typical examples. 3. How would you determine whether convulsions occurring during teething were dependent upon dental irritation or upon disease of the brain? What conditions exist in the spinal and cerebral systems to render them so frequent at this period, and what is the physiological explanation of the phenomena observed? 4. What are the local and constitutional causes of caries? Suggest plans of treatment calculated to counteract such causes as you may specify. 5. Classify the tumors known under the name of odontomes. How is their diagnosis from other enlargements of the maxillæ to be effected, and what is their pathology and treatment? 6. A patient applies to you with an unhealthy ulcer upon the side of his tongue,—to what causes may it be due? Explain how you would diagnose its character, and give the indications for treatment in each condition you may mention. [Reference might be made to cases lately treated in the hospital.] 7. Mention and give the symptoms, pathology, and treatment of the chief diseases attacking the mucous membrane of the mouth of the child. 8. Explain the uses and therapeutic action of iodine, chlorate of potash, carbolic acid, creasote, tannin, alcohol, and perchloride of iron in dental surgery. Write a prescription for—*a.* A mixture to be used in alveolar hemorrhage when uncontrolled by local means. *b.* An astringent wash to be used in cases where the gums are spongy and tumid.—*Monthly Review of Dental Surgery.*

Royal College of Surgeons.—The largest batch of students who have complied with the full educational curriculum required of candidates for the license in dental surgery of the college, underwent the written portion of their examination on Tuesday, June 22d, when thirty gentlemen presented themselves, to whom the following questions were submitted:

Dental Anatomy and Physiology.—1. State the different stages of growth in the development of a canine tooth and a molar tooth, from the commencement of the calcification of the cusp or cusps to the completion of the fang or fangs. 2. From which of the embryonic oral structures is the enamel developed? What is the form of the enamel prisms? Describe their arrangement on the crown of a molar tooth; and explain the advantages of such an arrangement. 3. What are the soft structures connected with the permanent teeth after their complete development? Enumerate the histological elements which enter into their composition; and state how they are arranged.

Dental Pathology and Surgery.—1. Give examples of reflex disturbance in relation to irritation connected with the teeth during their eruption; and explain fully the pathology of reflex nervous action. 2. Enumerate and briefly describe the several casualties that may arise in tooth-extraction. 3. Describe the different modes of treating inflamed and exposed tooth-pulp.

Candidates are required to answer at least two out of the three questions, both on dental anatomy and physiology and on dental surgery. The examiners were Messrs. Cartwright, G. A. Ibbetson, and S. J. Salter. The following questions were also put:

Anatomy and Physiology.—1. Give the dissection necessary to display the pterygoid muscles. Describe their attachments and action; and state whence they receive their vascular and nervous supply. 2. Describe the structure, relations, and functions of the soft palate.

Pathology and Surgery.—1. Describe the different methods of excising a portion of the tonsil; and state under what circumstances this operation may be required. 2. Mention the several causes, and describe the symptoms and treatment, of abscess of the antrum.

Candidates were required to answer at least one of the two questions both on anatomy and physiology, and on pathology and surgery. The examiners were—Mr. H. S. Hancock, chairman; Mr. Le Gros Clark, president of the college; and Mr. W. Savory.

The oral examinations took place on Tuesday, June 29th.—*British Medical Journal.*

DEFICIENT DEVELOPMENT OF THE TEETH AND CORTICAL CATARACT.—I. Hutchinson says (*British Med. Jour.*, March 6th, 1875) that the peculiar form of opacity of the lens or cortical cataract noticed in early infancy is nearly always accompanied by a marked deficiency of the enamel of the incisor, canine, and molar teeth. These last are particularly affected, and their rough, discolored appearance contrasts markedly with the bright, healthy appearance of the bicuspids. As the misshapen central incisors are indicative of congenital syphilis, so the first molars are characteristic in these cases. The author alludes to the observations made by Arlt and verified by himself as to the fact that those children affected with lamellar cataract have previously suffered from convulsions, and explains this by saying that the pathological appearance of the teeth is due to the persistent use of calomel. This assertion, that calomel was the cause of the dental malformation, gave rise to a very stormy debate in the Pathological Society.—*American Practitioner.*

ON MICROSCOPIC EXAMINATION OF BLUE LINES ON THE GUMS, SUPPOSED TO BE DUE TO LEAD-POISONING.—*La Revue Medicale* for April 12, 1875, quotes a paper by Dr. Gras on this subject from the *Archives de Médccine Navale.* He insists strongly that the lead-line is no mere deposit of that metal in or on the epithelial cells or connective tissue of the gum. It is due to a transformation of a soluble salt of lead into a sulphide of that metal during the slow circulation of the blood in the very minute capillaries of the gum. He says the demonstration is exceedingly simple, and almost painless. When we are in doubt whether a given blue line on the gum be due to lead or not, we should excise a fragment of the gum containing the line with a fine sharp scalpel or the point of a lancet, wash it with a camel's-hair pencil, and add a drop of glycerin; if necessary, flatten it out with needles, and examine it under the microscope with a low power. If the line be due to lead, in the midst of the normal tissues of the gum we shall find capillaries injected, filled and obstructed by blackish granules. These capillaries are in loops, or semicircular, or like double hooks, the outlines varying somewhat according to the section. In very old lead-lines the capillary walls are less evident, and their outlines somewhat indistinct. If a piece of buccal mucous membrane be excised, we should use carmine with glycerin, and a little dilute acetic acid, which shows the mucous papillæ and the capillary net-work. He suggests that in fatal lead-colic the intestinal capillaries and the nerves of the solar plexus should be examined in the same way for lead. [The reporter does not know to whom the credit of the suggestion belongs, but it has long since been proposed to examine the lead-lines by a simple microscope, or, in other words, a one- or two-inch biconvex lens; when, if in the capillaries, as the true lead-line is, it will be seen clearly to be dotted, and to follow the course of the vessels. It will thus be seldom necessary to remove any of the gum in the living subject, though after death this suggestion of M. Gras may doubtless be of considerable use.]—*London Medical Record.*

GRAVE SCROFULIDES OF THE BUCCO-PHARYNGEAL MUCOUS MEMBRANE.—According to Dr. G. Homolle (*Thèse de Paris*, 1875, *Bull. Gén. de Thérap.*, No. 10), lupus of the face is accompanied in one case out of five with lesions of the bucco-pharyngeal mucous membrane, and these parts should always be examined when facial lupus exists. These lesions may be derived from continuity in the region of the commissures of the lips or the nasal fossæ, or more frequently may occur in the mouth or throat without direct propagation. They may take the erythematous, ulcerative, tubercular, hypertrophic, or cancroidal form, the seat of the lesion having a marked influence upon the type which the disease assumes. Analogous affections may be primarily developed upon the mucous membrane of the palate, the isthmus, or the pharynx. They show themselves under two principal forms: lupus of the throat (progressive erosion) and ulcerating scrofulide (perforating ulcer). The latter coincides in certain young subjects with certain lesions which have been attributed to hereditary syphilis,—notched teeth, interstitial keratitis, etc. These primitive scrofulides of the throat are usually affections of childhood. Their favorite seat is the velum palati, and after that the posterior wall of the pharynx; they scarcely ever appear on the tonsils. The disease is rarely propagated to the epiglottis, and still more rarely to the larynx.

The grave scrofulous anginas are observed in manifestly strumous subjects. Tardy hereditary syphilis is perhaps one of the causes of their appearance. The diagnosis is always difficult. Syphilis must be constantly borne in mind, and a very careful examination of both patient and history should be made before pronouncing an opinion. Lupus of the throat, with progressive erosion and posterior adhesions of the hinder half-arches to the vault of the pharynx, is more easily distinguished than ulcerous scrofulides from other forms of chronic angina. The treatment is anti-strumous, with local cauterizations. X. —*Philadelphia Medical Times.*

Rheumatic Markings upon the Teeth.—Dr. L. G. Noel, of Nashville, writes to the *Journal of Medicine and Surgery*, of that city, February, 1875 :

It is not our purpose to add another symptom to the long list accompanying every description of rheumatism ; we only wish to call attention to one of its sequelæ, which has been much overlooked, and which we hope will serve to bring out an obscure part of its train of phenomena that may further the search after the primary physiological derangement.

These markings upon the teeth are seldom seen in acute rheumatism ; it is to chronic cases that they belong, seldom appearing until after middle life is past. They most frequently appear upon the crowns of the teeth, though they are sometimes seen upon their buccal and labial surfaces. It is that condition of the teeth treated of in dental works as "spontaneous abrasion," and, by some, has been thought to be attributable to mechanical causes alone, though it is difficult to see how this opinion is maintained, in the light of attendant facts.

The abrasion often begins as decay in the fissures on the grinding surface of the molars and bicuspids, but instead of following the tubuli, and dipping deep into the interior of the teeth, these become closed by a calcareous deposit as fast as laid open, and the decay spreads out into a wide saucer-shape. This cupping out of the teeth is not, however, confined to the molars and bicuspids, but commencing upon the cusps of the canines and cutting edges of the incisors as mere mechanical abrasion, their asperities disappear, the teeth become square and polished on end, and presently the surfaces begin to assume a concave, instead of their original convex, appearance. This cupping out may go on until the pulp is so nearly reached as to become irritated, to the point of inflammation and death ; but usually its irritation is only sufficient to cause a deposition of secondary dentine on the interior of its chamber, a part of its substance forming a matrix in which the lime-salts are deposited. Thus it is accommodated to its narrowing domicile.

In this way the teeth continue to shorten until they are almost level with the gums, unless the progress of the abrasion is arrested by the dentist, which end he accomplishes by capping them with gold.

The polished surface always maintained by these abraded teeth, together with the fact that the trouble most frequently begins with the cutting and grinding surfaces, has led many to suppose it to be due entirely to mechanical causes ; but the facts that it does appear upon the buccal and labial surfaces, which are not thus exposed to friction, and that it here presents the same polished and cupped characteristics, are difficult to reconcile with the mechanical explanation.

Then there are two other questions which it does not answer, viz. :

How is the abrasion kept up in the bottoms of the cups, when they cannot be reached by any portion of the antagonizing teeth? And, Why does not the gold wear away when it is used to cap them? It is a well-known fact that capping with gold does arrest abrasion, and that a capping of gold will last much longer than an equal thickness of tooth-substance upon the same tooth. It is clearly because the gold is not acted upon by the acid secretions which are destructive to the teeth. The abrasion may commence as mechanical attrition, but it is kept up by chemical action.

Now, the fact most interesting to the medical man is, that this condition of the teeth is nearly always found in the mouths of confirmed rheumatics, and, as has been already remarked, it is a concomitant of chronic, rather than of acute, rheumatism. What we want to arrive at, before we can intelligently treat any disease, is the primary aberration from true physiological action. A hasty review of the various and opposite treatments proposed for rheumatism is sufficient to convince any one that the pathology of the disease is not well understood. Some have pronounced it an inflammation of the arteries; others have thought the nervous system the prime seat of trouble; some contend that the derangement originates in the blood, and others that it arises in the lymphatics. Now let us see if this abraded condition of the teeth, in the light of other phenomena, does not throw some light upon the subject.

The abrasion is clearly due to the action of an acid oral fluid, and a litmus test always verifies the truth of this conclusion. M. Andral has shown that there is always an altered condition of the blood in acute rheumatism, and it is clear that the aberrations from normality in this fluid will be great or small in proportion as the attack is mild or violent. In the acute form of the disorder the blood exhibits a thick, buffy coat when drawn into a vessel, and the fibrin is largely in excess of the normal standard. Andral found, in one instance, 10.2 parts of fibrin in 1000 against the healthy standard, which is 3. The perspiration, which pours freely from a hot skin, has an acid odor, and the urine contains large quantities of uric acid.—*Half-Yearly Compendium of Medical Science.*

Teeth and Toothache.—In our last number, it may be remembered, we published a brief memorandum, by Dr. Duckworth, on the value of bicarbonate of soda for the relief of toothache. Dr. Duckworth's recommendation has brought more than one other capable correspondent to the front, and in the current issue of the *Practitioner* some little space is devoted to the matter. As the subject is one in which very many chemists and druggists, no less than medical men, are greatly interested, no apology will be necessary for treating it in our pages.

Dr. W. B. Holderness, of Huntingdon, writes:

"I see Dr. Duckworth speaks very highly of the use of bicarbonate of soda for toothache. I have for a long time very frequently been successful in giving patients relief by stopping the hollow tooth with a paste made in the palm of the hand, by dropping on to a good pinch of the bicarbonate of soda as much tincture of opium or of the vinum opii as the soda will take up, working the whole into a paste, and putting into the tooth." This hint may possibly be useful in some cases, but Mr. J. Smith Turner, M.R.C.S., and Dental Surgeon to the Middlesex Hospital, offers a far more complete and useful contribution to the discussion. He holds, and, as we think, not unreasonably, that while the employment of bicarbonate of soda will not unfrequently be attended with great benefit, to suppose that its application will invariably produce the desired result may lead to unreasonable disappointment. The term toothache is applied indiscriminately to all pain situated in or around the teeth, but the disturbance may arise from different causes. The pain in Dr. Duckworth's case evidently arose from the covering of the tooth-pulp being insufficient to protect it from the action of the saliva, or from the exposure of the dentine to the secretions of the mouth, through the loss of its natural covering, the enamel. Hence the subsidence of pain on the use of the antacid. The same application is of great use where the enamel structure is feeble and where numerous defective spots are present, as is frequently seen in young phthisical patients; also in children where there is a general defective condition of the first teeth, proceeding it may be from neglect or from defective development, or from some disease of the mucous membrane; and in pregnant women in whom the teeth are frequently found decaying round the base of the crowns in a line with the margin of the gum. That the toothache from which such subjects suffer is due to a vitiated condition of the fluids of the mouth may be inferred from the sudden access of pain so frequent after eating or during sleep, and which is so often ascribed to increase of temperature, or to the increase of circulation in these parts owing to the recumbent position, but which is speedily relieved by the use of a tepid solution of soda bicarbonate. Mr. Turner then continues:—Some of the conditions inducing toothache are equally patent or equally obscure to the general practitioner and to the specialist. Ulceration of the membranes of the mouth, for example, would be at once observed, while irritation of the dental nerve in the absence of a visible cause could only be diagnosed after careful and extended observation and perhaps some unsuccessful efforts in treatment. There are, however, conditions and suffering and consequent constitutional disturbance which the general practitioner should be able to ameliorate until such time as special skill be available. A decayed tooth may give pain although the tooth-pulp be not exposed. The alkaline lotion will not give relief, and if the saliva be tested it may be found normal. The cause of the pain must therefore be sought in the tooth itself. The decayed dentine is an irritant; this ought to be removed, at least partially, if not entirely. To do this without exposing or wounding the tooth-pulp is a delicate operation, and a man not in daily practice could not be expected to accomplish it completely; still, enough may be done to serve the immediate purpose. A small mouth-glass and a few excavators, such as are to be had at any dental depot, are all that are required in the way of instruments. Their cutting edges should be round or spoon-shaped; if they have any sharp angles they are much more likely to wound the tooth-pulp. The cavity should be syringed with tepid water, and that may be sufficient; but there is generally a quantity of soft dentine which should be removed if possible. The cavity should be dried out with cotton-wool or some other absorbent, and a small pellet of wool moistened with carbolic acid and glycerin should be placed in it, and over this a piece of wool partially moistened with mastic (white hard varnish answers admirably) should be packed. The packing may be accomplished with a blunt probe, and the pressure should be light and not in the direction of the pulp-cavity. This will serve till a permanent plug can be introduced, but should not be trusted beyond two or three days, especially in cavities between the teeth.

If the cavity be on the masticating surface of a tooth, the wool should be free from pressure on the occlusion of the antagonizing teeth. If it be an interstitial cavity, the gum beyond the margin of the cavity should be disturbed as little as possible unless it has grown into it, when the wool should be packed with the view of pushing the gum out. If the margin of the gum be left projecting into the cavity, its secretion will become abnormal, owing to the irritation caused by the wool; the cavity will be inundated with the secreted fluid, which will have no way of escape, and the discomfort of the patient thereby aggravated rather than relieved. If possible the wool should not be allowed to depend upon support from the adjacent tooth for retaining its position, as the pressure is likely to separate the teeth, when the plug will leave the walls of the cavity, and so matters will return to their original condition. The wool used for this purpose should be deprived of its greasy character; hence the pink wool which has been cleansed before dyeing is best for use.

Toothache may arise from an exposed tooth-pulp, and in such a case the same course of syringing and cleaning should be pursued as already laid down, and some application used which will subdue the irritation of the pulp, applied as in the former instance and covered over with wool and mastic. Creasote is an old and deservedly a favorite remedy for such a condition of things, but it should be pure wood creasote, as that which is made from coal-tar is very likely to act as an irritant. The following mixtures are recommended for use in place of creasote, and if complication be a merit they have that advantage:

℞.—Acidi carbolici solutionis saturatæ,
Chlor. hydratis sol. sat.,
Tinct. camph. co.,
Ext aconit. fluid., āā fl℥j;
Ol. menth. pip., ℥ss.

℞.—Chloral hydrat., ʒj;
Aquæ, fl℥ss. Misce, et adde,
Tinct. aconiti (Fleming), ♏xv;
Chloroformi,
Ætheris,
Spt. vin. rect., āā ♏xx.

℞.—Liq opii sedativ.,
Ol. caryophyll., āā fl℥ji;
Camphor, ʒiss.

This last I have found very useful.

Pain may arise from inflammation of the periosteum, and may be situated in an otherwise healthy tooth which has been jarred or wrenched; such cases are not uncommon in the game season, from shot or bone splinters getting between the teeth during mastication. Or it may come from a tooth carrying a large mass of metal stopping having been subjected to unusual conditions, such as exposure of the side of the face next which it may be situated in riding against wind or rain. A low state of health, constipation, exhaustion after violent exercise or prolonged occupation, rheumatism, scrofula, or syphilis may all produce this inflammation. The gum surrounding the affected tooth is visibly inflamed, and the tooth is tender to the touch and becomes elongated and loose. The degrees of inflammation are various, and in its early stages may be cut short by wiping the gum dry and frequently applying tincture of iodine of double strength all over the inflamed part. A piece of cotton-wool soaked in water as hot as can be borne, and laid between the gum and the cheek, makes an excellent poultice, and if accompanied by a slight aperient is almost sure to give relief in a chronic case. The constitutional treatment required must be obvious to medical men, who have much more command over their patients in the administration of general remedies than the dentist; but I may mention that there is no medicine more likely to cut short in its early stage an acute case of periostitis connected with the teeth than five grains of pil. saponis co. Two leeches applied to the gum over the affected tooth have repute for doing good, but in some cases prove very disappointing. If there be marked swelling of the gum towards the apex of the affected tooth, lancing is the best thing that can be done, but to be effectual it must be done thoroughly. The instrument should be strong as well as sharp, and capable of cutting through the alveolar plate between the gum and the tooth. Before lancing, Mr. Tomes recommends that the gum should be painted with equal parts of tincture of iodine of double strength, and Fleming's tincture of aconite.

Teeth may become tender around the neck from recession of the gums, or from an artificial case of teeth being attached to them. The exposed parts of the tooth should be cauterized with nitrate of silver, and if a metal plate have to be worn again immediately, a layer of tissue-paper ought to be placed between the cauterized surface and the metal. As the nitrate of silver should be allowed to remain on the tooth a few minutes in order to prove effectual, the cheek and tongue and saliva should be kept away from it as much as possible by holding some ordinary cotton-wool round the tooth. When the wool is withdrawn a strong solution of salt should be used immediately, to convert any free nitrate into an inert chloride. Unfortunately, the nitrate of silver cannot well be used on the necks of front teeth, where a ring of sensitive decay is often found, but it is a valuable remedy where appearance is not in question.

The after-pain of an extraction may be modified by washing away the blood clot and lightly plugging the alveolar cavity with wool saturated with

℞.—Acidi carbolici glacialis,
Liq. potassæ, āā ʒj;
Aquæ dest., ℥j,

as recommended by Mr. Tomes in his "System of Dental Surgery."

From the foregoing remarks it may be inferred that there are degrees of inflammation of the tooth-pulp and of the periosteum. As the treatment of subacute inflammation of the tooth-pulp is very limited and quite incomplete unless the tooth be properly plugged, so in cases of acute inflammation of that organ the general practitioner can only relieve the patient temporarily, that is, if the tooth is to be saved. It may be well, however, to point out that subacute inflammation may arise from injury by mechanical violence, or from the masticating surface of a tooth being denuded of enamel even to a very small extent. The tooth becomes troublesome and frequently reminds its owner of its existence when subjected to thermal changes, or even the ordinary work of mastication. If on careful examination of a tooth so affected there be no signs of structural defect observed, search should be made for a decayed tooth elsewhere. When this is found, a process of examination, such as tapping with an instrument, or probing the decayed part, or directing a stream of cold water on to it, may start all the symptoms complained of in an intensified form. In rheumatic people and people under the influence of mercury the irritable state of the teeth is often found. In acute inflammation of the tooth-pulp the history generally extends over a long period. Different substances have annoyed a tooth in which a cavity has been known to exist a long time, but which, according to the patient, has always remained the same. Sweets or bitters, heat or cold, have every now and then caused uneasiness, but when these disturbing causes have been removed the pain has ceased. But at length the periods of cessation have diminished, and the length and intensity of the attacks have increased, the pain radiates from the tooth to the other teeth and over the side of the face, and assumes a throbbing character. These attacks last several hours and then suddenly subside, but surely to return again, sometimes without the smallest apparent provocation, or if the patient lie down. This will go on for a shorter or a longer period and with varying intensity, according to the constitutional state of the patient, till the pulp dies. The next state of the tooth is the commencement of an alveolar abscess, which, if not attended to, may involve the removal of the tooth and even of a portion of the alveolar plate, or even further mischief.

In chronic inflammation of the tooth-pulp the pain is less regular in its advent, shorter in duration, and less severe than in acute cases. The peculiarity of most importance is the straggling neuralgic pain, which is rarely referred to a definite center. If any tooth be specified as its seat, it is not unlikely to be a sound one; but even its being decayed is not sufficient in itself to condemn it. In fact, the tooth which is nearly destroyed by caries is not so likely to be the offender as one which is in a better state of preservation. The careful application of a blunt probe to the floor of the cavity will readily detect the irritated nerve, which should be treated as already described, or the tooth removed if worthless.—*The Medico-Pharmaceutical Review.*

TUMOR OF THE LOWER JAW.—The president exhibited a tumor which he had removed from the lower jaw of a boy, eleven years of age, who was a patient in Steevens' Hospital. About fifteen months before admission a tumor commenced to grow at the root of the canine tooth of the left side of the lower jaw. It increased rapidly in size during the last three months, and implicated the right side also. The boy never suffered from any pain; in fact, the tumor was absolutely painless. When admitted, the tumor extended almost from one angle of the jaw to the other. The tumor was uniform, and springy to the touch, and some of the teeth were imbedded in it. After it had been removed and a section made, they saw a rim of expanded bone filled in with softer material. There was evidently a great expansion of the bone. The anterior and posterior parts were in detachments. Microscopically examined, the tumor presented a remarkably good example of giant-cell sarcoma, which is a variety of sarcoma consisting of very large cells, which are filled with smaller ones containing nuclei. The patient made a very good recovery.—*Dublin Pathological Society Reports, in Medical Press.*

BUCCAL LIPOMA.—Dr. Labat, in his *Thèses de Paris*, 1874, has collected thirty-two cases of this affection, and has from these facts constructed a special chapter of pathology possessing great interest. These lipomata may occupy indiscriminately all points of the mouth, lips, tongue, gums, cheeks, roof of the mouth, soft palate, and palatine arch. Their essential characteristics are: to be situated directly under the mucous membrane; to form a distinct projection under it, and sometimes under the skin; and to show a transparent yellowish color through the mucous membrane. They offer a peculiar sensation of softness to the touch, called lipomatous; thus their diagnosis is generally easy. They are easy of extirpation, in consequence of their sub-mucous situation; therefore they should be operated on through the mucous membrane, and not through the face; besides which, this proceeding presents the double advantage of rendering the operation harmless and avoiding disfigurement of the countenance.—*London Medical Record.*

FRACTURE OF UPPER JAW—EMPHYSEMA OF FACE AND NECK.—M. J., a plasterer, aged twenty-three, was admitted November 18th. The patient was subject to epileptic attacks, and, during a fit, fell from the platform of a railway station on to the line, striking the left cheek violently against one of the rails. On applying for admission he had recovered from the effects of the fit, and complained of soreness over his left cheek, and pain when he attempted to open or shut his mouth, the pain being much increased when he tried to chew anything or when he pressed the teeth together. The left side of the face was swollen and discolored. On examining the swelling, slight but distinct emphysema could be detected as far down as the lower border of the under jaw, extending backwards to the ramus. On passing the finger along the left superior maxilla above its alveolar border, the lower part of the malar process was found to be much flattened compared with that of the opposite side, and running backwards from that point was a sharp ridge which seemed to extend to the posterior border of the bone. The tissues over this elevation were emphysematous, there was great pain on pressure, and the teeth below were very tender when touched, but no bony crepitus could be felt.

The patient was ordered to be kept quiet, and put on a fluid diet.

On November 19th the emphysema had extended downwards as far as the hyoid bone, and backwards behind the ramus of lower jaw.

On the 20th, emphysema had reached the level of the cricoid cartilage. The pain on moving the jaw was still very great, and the swelling of the cheek had increased a little.

On the 21st, the emphysema began to disappear and the swelling to subside.

On the 23d the emphysema had entirely gone, and the pain on moving the jaw and on pressing on the teeth was less.

From this time the patient gradually progressed, and on December 9th, when he was discharged, the mouth could be opened and shut, and he could chew meat with very slight discomfort indeed. The lower part of the malar process remained depressed, and the elevation running backwards still remained much as it was on admission.—*St. George's Hospital Reports, in the Lancet.*

PARTIAL EXSECTION OF BOTH UPPER JAWS FOR ENCHONDROMA.—Dr. Porter reported to the Boston Society for Medical Improvement

(*Boston Med. and Surg. Journ.*, Jan. 7th, 1875) the following interesting case of enchondroma of the upper jaw. The patient, a gentleman aged fifty-one, of excellent health, first noticed, nine years ago, a congested condition around the two central incisors of the upper jaw. These were "pivot" teeth, inserted twenty years before, and as they often became loose, he had been in the habit of replacing the pivots by the ends of matches. There finally resulted a necrosis of the alveolar process around these teeth, which gradually exfoliated. Soon a defined tumor commenced in the above locality, which has been growing for three years. It has been for the most part painless, but has doubled in size within six months. The patient's family history shows no record of tumor.

The tumor now involves the upper alveolar arch nearly symmetrically on both sides, from the first molar tooth on one side to the corresponding tooth on the opposite side, extending nearly up to the infraorbital foramina, pushing upwards and forwards the nose and upper lip, producing a very considerable deformity.

The operation for the removal of the growth was performed with ether. . . .

The tumor, examined by Dr. R. H. Fitz, proved to be enchondroma. The patient made a rapid convalescence, and returned home on the eighth day after the operation.

In four months from the first operation, he noticed a return of the growth on each side of the nose, and when seen two months later, the tumor of the right side was about the size of an English walnut, involving the nasal process of the superior maxilla; that of the left side was similarly situated, but less in extent and size, being as large as a chestnut.

Before the operation for the removal of the tumor was commenced, the patient was etherized and tracheotomy was done. . . .

The patient rallied well from the operation, and made a more rapid recovery than on the first occasion, returning home on the seventh day. The tumors, examined by Dr Fitz, were like the first, but richer in cells.—*Monthly Abstract of Medical Science.*

Salicylic Acid.—This agent is being tested by quite a number of dentists, all of whom, so far as we have had an expression, report very favorably of it. We have been using it for more than a month, and are better pleased with it as we become more familiar with its use. It seems to serve well many of the purposes, at least, for which creasote and carbolic acid have so generally been used. The following cases represent what seems to be almost its average efficiency: Dr. T. had a left central incisor, with a medium cavity of decay upon the distal proximal surface, which had been filled for over twenty years. The pulp was never exposed. About nine years ago, it became devitalized from some unknown cause; an opening was made at that time through the palatine surface into the pulp-canal, and the dead pulp and débris were removed; disease of the periosteum with tendency to the formation of abscess occurred previous to this. Though the ordinary treatment for such cases was employed, a chronic irritation and soreness remained, so that slight percussion on the tooth would give pain, varying somewhat at different times, from a variation of systemic and other conditions. The canal at and near the end of the root was filled with a small pledget of cotton moistened with creasote, and the remainder of the canal and chamber were filled with Hill's stopping; this remained till about one month ago, when the cotton and stopping were all removed, the latter in a very offensive condition; the opening was made through the end of the root, through which blood and pus of a very offensive character escaped. The whole was cleaned out as thoroughly as possible with the excavator and water. Then the canal was filled to one-half its length with salicylic acid in crystals, and the remainder filled with Hill's stopping. Within twenty-four hours the indications of an abscess had entirely gone, the soreness had entirely abated, and has not in the least returned. This was a result that no one would have anticipated by any ordinary mode of treatment.

Mr. M. had an alveolar abscess from the second right superior molar, with free and copious discharge of pus through the posterior buccal root; had been discharging for about five months; had been treated with carbolic acid for two months without any apparent improvement. About two weeks ago cleaned out, and injected a solution of salicylic acid and phosphate of soda in water three times within a week, keeping it closed up in the mean time, during which time the discharge of pus was entirely arrested. Before this treatment there was considerable soreness of the tooth, which had existed in varying degrees for months; after the first application this was wholly relieved, and has remained so since. Every indication is present that a permanent cure is about established. Other cases have been treated, giving about the same results, some of which we will perhaps give after more experience.

It may be used in various methods and different solutions. It may be used in the crystal, as in the first case above described, or in the watery solution, though it is very sparingly soluble in cold water, about one of the crystals to three to five hundred parts of water; warm or hot water dissolves a far larger proportion, but precipitation takes place on cooling. Other solvents are preferable when a stronger solution is required or desirable. Alcohol dissolves a large amount of the crystal, compared with water; this solution may be diluted very considerably with water, without precipitation taking place if gentle heat is applied. Sulphuric ether dissolves a far larger proportion of the acid than alcohol. This solution is efficient when it is desirable to carry the crystal to points difficult of access: the ether immediately evaporates, leaving the crystals where they have been carried in the solution.

A solution of phosphate of soda is a valuable solvent; it dissolves a large per cent. of the acid, and from the promptness of its action there is some reason to think that its operation is energized by the power of the phosphate of soda. Further experience, however, must verify this statement before we will venture to emphasize it.

As a disinfectant and antiseptic, it will be a very desirable ingredient for tooth-pastes, powders, and washes. We have in use a tooth-wash prepared by Dr. Wm. Martin, of A. B. Merriam & Co., of this city, which contains salicylic acid. It is a very pleasant and a very effective wash, for disinfection. We are so impressed with the value and importance of this agent that we do not hesitate to say to all, try it.—*Dental Register.*

SALICYLIC ACID.—One of the disadvantages attendant upon the use of this long known, but recently introduced, tasteless and harmless disinfectant has been its very slight solubility in water. The phosphate of soda increases its solubility somewhat, but it has been reserved for a chemist with the euphonious name of Rozsnyay to discover a better means than this. The salt employed by this chemist is one which itself possesses a certain antiseptic power, and this increases the power which the mixture has of retarding putrefaction. This salt is sulphite of soda. If one part of salicylic acid and two parts of sulphite of soda are dissolved cold in fifty parts of water, the solution will be perfectly clear. The solution does not irritate an open wound in the slightest, and its disinfectant power is so great that, while a certain quantity of milk, to which had been added a solution of salicylic acid prepared with phosphate of soda, curdled in five days at ordinary temperature (66° Fahr.), another portion of milk, to which was added a solution of salicylic acid prepared with sulphite of soda, remained fluid for two weeks.

Rozsnyay recommends one part salicylic acid and one or two parts sulphite of soda dissolved in from fifty to one hundred parts of water for general use.—*Scientific American.*

HINTS AND QUERIES.

Is there any process by which oxychloride of zinc can be restored to its former virtue, after having deteriorated to that extent that it will not set or become hard?—S. T. B.

Has there been any complaint that celluloid heats the mouth? I have never met with such a case, but a dental friend tells me he has.

For my own part I prefer celluloid to rubber, so much that I would not use the latter if a license were given me.

I use no apparatus except a small pot, and put the flask down with a rubber clamp.—W. H. S.

Mending Celluloid Plates.—For the benefit of any who may be hesitating about the use of celluloid, I would like to inform them that after a considerable experience with it I fully indorse all the good things which have been said about it in the journals.

I am especially pleased with the facility with which celluloid plates can be repaired. If there chances to be a flaw in a plate I take filings of celluloid, moisten them with spirits of camphor, and smooth them down with a heated burnisher (taking care not to have it too hot). In one plate which I made, the metal used to form the air-chamber cut through the plate, leaving a hole half as large as a three-cent piece. I cut thin shavings of celluloid and laid them over the hole at different angles, moistening each piece as I laid it down with spirits of camphor, and pressing them lightly with the blade of my pen-knife warmed in the flame of an alcohol lamp. After eight months' wear, that plate is perfectly sound.—S. M.

Directions for using the "Triplex Rubber Dam Punch."—First ascertain the number of teeth you wish to inclose, then take a pamphlet or magazine (thick enough not to be penetrated), lay it on a table with the rubber placed smoothly upon it; then proceed to punch whatever holes are required. Thus you can leave space that may occur between teeth and also get a true circle of the mouth.—F. W. Dolbeare.

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ORIGINAL COMMUNICATIONS.

DENTAL CARIES.

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(Read before the Pennsylvania State Dental Society.)

THE present time is one wherein the dental profession is profoundly agitated by laudable ambition to elevate the standard and increase the requirements, already made, to entitle its practitioners to enter the ranks of its societies or associate with their fellows. Believing that the most direct way in which this is to be accomplished is practical personal education, particularly in the higher attainments of our specialty, I have felt that a short essay, enabling me to introduce the subject of this paper for discussion, would be profitable. I have hastily thrown together a few remarks, with the hope that they may draw out statements of facts, which will enable me and perhaps others to more thoroughly comprehend the study of caries, and better fit us for such exalted position as we would all see our proceedings occupy, than any extended and acrimonious discussion upon education could possibly bring about.

The laws of life as we find them are intimately connected with a combination of checks and balances, which limit the existence of the individual and finally cause death. The necessity for this appears evident from the well known fact that if the superficies of the dry land of the world were many times multiplied there would not be sufficient to support, with even a slight degree of comfort, the swarming myriads of creatures that would be struggling for a foothold. Death, by removing this immense surplus, is an untold blessing to the living, although to the uneducated an undefined terror.

Man in the lowest condition of the savage rarely survives many years beyond those of great usefulness, for bloody wars and encounters with wild beasts reduce the numbers by a most effectual and speedy process, which rarely fails to exterminate, before maturity, those who are unqualified to survive that period and beget children. With the enlightened and even the civilized this differs; but in the same proportion as the law of the survival of the fittest is interfered with by science, do we find the necessity for death to make his approaches by more stealthy means. The Spartan parents, who, by statute, were compelled to expose their delicate offspring to the mercy of the gods upon the sides of Mount Taygetus, were thus prevented from rearing them to become progenitors of children still less fitted for life's cares and duties. Nature, however, disdains the feeble barriers thrown by man around life, and sooner or later will claim her victim for death. Yet science has proven her worth. Statistics show that within a few generations the average duration of life has been more than doubled. To-day there are millions of human beings who are successful producers, adding to the store of luxuries for themselves and their fellows, who, in less favored ages, would have filled infants' graves.

The appropriation of food is at the foundation of life, and the digestive apparatus as the means of preparing the building material is undoubtedly the most important of the various and complicated living structures; nature by her very elaborate formations, from the lowest plant to the highest animal, clearly indicating its paramount value. To the dentist are intrusted the keys that unlock the portals of this labyrinthine laboratory; and to the dentist of the future, I doubt not, will fall the entire responsibility of guarding this whole combination of organs and their functions from disease. In order, then, that the magnitude of the duty may not be lost sight of, it would seem fit that attention should be directed to something more profound than the removal of carious tooth-structure and its replacement with an artificial substitute. If we would have the true standard of the dentist proper, less attention to the mechanical operation in general and more study of the physiological means of combating the diseases of the teeth should be the order of the day at our gatherings. It has been very thoughtlessly said by one of our leading surgeons that "dentistry is to scoop out the decay and stuff in a filling;" but such a sweeping remark is only of weight with the superficial observers of the work that the profession throughout the world is accomplishing.

The causes that primarily affect the teeth are those that produce defective structure of their component tissues, and these are to be sought in the general pathological conditions of the system; unfortunately, they beset the embryo from the day of conception to that of birth, and continue from infancy to old age. Their name is legion, and they can only be studied by careful classification.

Many of our treatises upon the subject of caries give but little attention to the predisposing causes; and to-day the chemical theory of decay seems to be gaining ground; some of the foreign writers have recently committed themselves exclusively to it, as the best explanation of the variations of structure found in the diseased condition we have under consideration.

Although upon this side of the Atlantic there are few opportunities for examination of natural teeth mounted upon plates and worn in the mouth until partial decomposition has taken place, we still have abundant witnesses to testify to the difference of the breaking down of the dentine or enamel of a devitalized tooth from one with a living pulp. In the latter the difference of density of the layer of dentine immediately beneath the carious portions, particularly in healthy mouths, is perceptible to the hand of the experienced operator when excavating for retaining points, or when shaping the cavity; and there are but few who do not recognize the softer dentine in its normal condition after piercing this translucent zone. Again, the alteration of the density of the dentine of women before and after pregnancy and lactation; of human beings generally at different stages of life, or even under altered conditions of the general health, all confirm the stand long ago taken of the vitality of the teeth, and, consequently, being vital structures, we may look for those changes of condition in them which follow or precede disease. These alterations, however, may be as modified in their appearance as the structures in which they present themselves are in texture. Perhaps following upon this we may also find that in proportion as the tissue is high or low in the scale of life, the course run by the disease may be rapid or slow, the repair complete or very imperfect.

Now, we all know that dentine and enamel, especially the latter, are possessed of but little life, and per consequence they are rarely susceptible of marked reparative action. How far by protecting from violence, in masticating food and thermal changes, the dentist of the future may be able to accomplish the replacement of lost dentine by reparative tissue, no one, at present, may be able to show; but the success attending pulp-capping in many localities may be taken as encouraging to those who would work in this particular direction.

The cause of dental caries is yet a subject for discussion, and the various theories that have been taught at different times within the last century seem as yet not fully to account for all the attending phenomena. Probably we are upon the eve of more successful study of this disease; and I am persuaded that a more thorough understanding of the laws of general pathology rather than of chemistry will best fit the investigators of the future to apply sound doctrines upon this interesting subject.

The intimate connection we find between the mouth and the digestive apparatus, the former being always subjected to an examination in order to determine the condition of the latter, will fairly demonstrate that the teeth are dependent upon the general health much as any tissue in the same scale of vitality might be expected to be. Hence they are subject, like the other tissues of the body, to disease arising originally from such a variety of causes that these must be classified in order to study them. It is indeed difficult to select a single authority upon this disease, who has not partially discovered some of these active causes which are continually at work; the great objection to most of these teachings being that each author seems invariably to have fallen into the human error of giving too great prominence to the particular reasons assigned by himself, and forgotten or ignored those of other investigators.

This may be demonstrated by a review of these theories. The vital theory of Mr. Bell loses sight of the preponderance of the inorganic material over the organic in the tooth-substance; while the chemical theory of the continental writers, from similar cause in the reverse direction, makes an almost equally unfortunate mistake. Mr. John Tomes certainly made a great step forward when he combined the two; and to-day, with modifications for the advance of science and discovery of hitherto but little known, or imperfectly understood, conditions of the mouth and its secretions dependent much upon the general health, it is the nearest approximation to the correct handling of the subject. The theory of cold affecting the teeth, although as old as Hippocrates, is likewise suggestive; and inasmuch as physiological action may be altered into pathological by this agent, so may it play a part, by no means unimportant, in the production of the causes of caries. The same may be said of the theory of Ribe, with regard to heat, save that it is by no means so ancient as the former.

But I am fatiguing you by this review of familiar stories, and will ask pardon for my prosy recital of but one more of these theories.

Dr. Koecker, who wrote in the early part of the second quarter of this century, considered that caries was contagious. Inasmuch as we find the lower forms of life in the mouth in cavities of decay, may not their presence indicate that in some degree also there may be results from contagion? Who has not noticed that most of the causes which reduce the system, or lower the vitality of the individual, are accompanied by more or less of carious action? Close confinement in ill ventilated school-rooms, while it depresses the vitality of the unfortunates who are subjected to its influence, makes them the ready victims of diseases, and markedly so of dental caries. This may operate from a variety of directions, as, for instance, the depraved appetite, which refuses healthy food, and by removing from the patients the natural stimuli of health, at the same time deprives them of the organic and inorganic materials of food required to build up sound tissue. Many times have I seen the most beneficial results from changing the mode of life. So simple a remedy as gentle exercise for several hours each day in the open air has with my patients more than once turned aside the current of decay which threatened to overwhelm the teeth, and enabled nature to erect her beautiful barriers against its further progress. So well convinced am I of the importance of the "*vis medicatrix naturæ*," that it is my rule to refuse to risk operations in the mouths of those who will not take the trouble first to prepare their systems for the operative part of the dentist's practice.

It should be our first aim to discover, in each case presented for our attention, the cause or causes of the particular trouble, and, by removing them and bringing about healthy action, defend ourselves against the very natural and common complaint, that dental operations will not save the teeth. This is, to a certain extent, true; we all know that the most perfect gold filling alone will not preserve from further inroads, unless the tone of the mouth and whole organism is improved. If the dentist is not a physician as well (I do not mean simply holding a degree, for that alone makes nothing more of him), then is it true that to "scoop out the decay and stuff in the filling" is dentistry.

Trusting that I may leave this subject to the profession at large to glean from the many theories their gems, and so arrange them as to produce a harmonious crown, I will close by calling attention to an old practice that of late has been revived. I allude to the transplantation of teeth; two cases having recently been attempted by me with marked success.

Case I.—Some months ago the root of a superior first bicuspid tooth, in the mouth of a lady, was treated and filled by me after the crown had been completely broken down and removed. Over two months since I found it advisable to remove the corresponding tooth from the mouth of one of her daughters to bring the canine tooth into place. I therefore felt myself justified in first extracting the root from the mother's mouth, to enable me to transplant that of her daughter. This operation was not accomplished without some difficulty, owing to the firmness of the investing process and the very slight portion of the root not enveloped by it. The forcing of delicate beaks of a fine pair of root-forceps up between the root and the bone made me feel that the laceration and crushing unavoidably inflicted would much endanger the final success of my attempt. The removal of the child's tooth was readily accomplished. After drilling to the pulp-chamber and removing the pulp, washing out the alveolus and tooth with tepid water, I pushed the tooth, with the canals and the vent to the pulp-chamber opened, up into the lacerated alveolus, and found it to be retained there by the elasticity of the walls of the latter. Directing the patient to close the teeth, the palatine cusp impinged upon the lower tooth sufficiently to make its partial removal necessary for the correct occlusion of the jaws. This was accomplished by steadying the tooth, yet in its new position, with the finger and thumb, while with the burring-engine I ground off enough of the cusp.

The patient was then dismissed, with directions to keep the gum covered with a pellet of cotton saturated with lead-water and laudanum, but to let me see it every day. Upon the morning of the third day I directed that a gentle aperient—a Seidlitz powder—should be taken immediately upon awaking. Up to about a week or more there was nothing but the mildest symptoms of inflammation apparent. At this time there was a slight fistula in the gum over the root, and this considerably raised in the socket and loosened. For the first time, I now passed a ligature securing it to the cuspid tooth. This attachment was removed by me after a few days, and from that to the present nothing further has been done in the way of treatment. The tooth has gradually become more firm, until the patient, when last seen, said it was comfortable and capable of masticating soft food, as bread, etc.

Here there was no danger from specific or blood poison, nor occasion to take precautions against transmitting hereditary disease. The principal disease to guard against was the same as theoretically threatens patients in many other dental operations, namely, trismus. Upon the slightest symptom of such fatal malady, I would, of course, have extracted the tooth and followed with prompt treatment, which precaution, however, I presume it is unnecessary for me to lay stress upon before the experienced and intelligent fellows of this society.

Case II.—More than seven years ago, I found it necessary to re-pivot for a lady just placed under my care, three crowns of teeth, but explained to her that by reason of caries about the pivots, and consequent weakening of the roots, the operation was only attempted with the hope of retaining them for a limited period. Since that time I had to re-pivot the right lateral incisor twice; the last a little more than a month since, when I found the tooth-pivot could only be held in position by enveloping it in cotton saturated with varnish.

For seven years we had in vain looked for a pair of lateral incisors so crowded out of their natural position in the arch, as to make them a positive deformity to the owner, and not admitting of reasonable hope of being brought into their proper places. When reduced to the last extremity, and after I had constructed for my patient an artificial denture to be worn in case of the failure of the pivoted roots, which was hourly expected, the long-looked-for deformity presented itself in the mouth of a young lady, of similar complexion and color of hair, who applied for the removal of her lateral incisors. I at once sent for my former patient, and called upon my friend Dr. Garretson, requesting him to meet me in consultation, to examine the mouths of both patients. He took a lively interest in the case, fully concurring with me as to the propriety of the operation, and, what was here most important, the irreproachable purity of the blood and health of the young lady. I removed the pivoted root, which was covered by a tumid and dark purple gum; found the cause of this to be that the root itself was incrusted with a brownish deposit, the external plate of the alveolar process being almost completely absorbed, as a result of the low grade of inflammatory action from the presence of the diseased root. The healthy lateral was then extracted, its pulp removed, and after the precautionary washing away of all red blood-corpuscles, it was inserted into the alveolus, and, by a waxed thread figure-of-eight ligature, secured to both the central incisor and an adjoining pivoted canine.

The same treatment was pursued as in the former case, with results almost as satisfactory, indeed more so, if the difference in the condition of the two processes be taken into consideration. The tooth, with the exception of being slightly longer, which was subsequently corrected by grinding off as in Case I., was a perfect match in shade and shape; when seen a few days ago it would have puzzled an expert to determine whether it ever had any other than its present position. The gum in a very few days assumed a healthy appearance, and the health-line was almost as clear over the transplanted tooth as over its adjoining central incisor.

Since the foregoing was written, another case of interest has been successfully treated by me.

A lower molar had been repeatedly filled, but, owing to an unusual amount of submucous tissue overlying the distal face, caries followed after each attempt to prevent it, until the pulp became so nearly exposed as to make it almost impossible to fill with gold, from the danger of blood flowing under the rubber dam, which could not be satisfactorily held in place owing to the shape of the tooth favoring its displacement by the pressure from an exceedingly powerful masseter muscle; oxychloride of zinc and other temporary fillings offered but little hope for success.

I therefore extracted the tooth (although a large portion of the thin walls of the cavity were broken in the operation); after cutting off the curved end of the root, nearly an eighth of an inch long, I drilled into this, enlarging the open pulp-canals, and inserted two gold screws; the end of the root with the contained screws was then rounded and polished. After the removal of the pulp the cavity was used as a retaining point for the crown filling, all of which was built up with cohesive gold; this being finished, the tooth was replaced. In three days almost all soreness had disappeared, the tooth being used in masticating. Since that time I have seen it,—my patient says he has now entire comfort with it, and more satisfaction in its use than for some years. To every appearance the tooth will be of service for a long time, and so far has not given any sensation, the patient ordinarily not being aware of its presence.

October 31st, I have just heard from the husband of my first patient that her tooth is now quite solid and comfortable; in fact, that the operation is in every way satisfactory.

In conclusion, it is my conviction that it will be possible to replace lost teeth by immediately after their extraction inserting artificial substitutes, for which purpose we might use:

1st. Corresponding teeth from other mouths.

2d. Teeth from another, or the same mouth, so altered in shape as to suit the case, as a bicuspid cut to resemble a canine or incisor.

3d. Teeth from mouths of lower animals.

4th. Artificial teeth made from ivory or even porcelain possibly might be made to answer the purpose where neither of the above could be procured.

SUGGESTIONS.

BY DR. WM. C. EASTLACKE, BERLIN.

(Read before the American Dental Society of Europe, at Hamburg, August 3d, 1875.)

We have heard of travelers visiting for the first time new lands and new scenes, who, under the enchantment of first impressions and in the enthusiasm of newly-acquired knowledge, have entered into detailed accounts and critical discussions, which would have been widely different had they waited until more experienced judgment had toned down their enthusiasm.

So we recall to mind our innocency in the early years of our practice; the ease with which questions were hastily solved; our blissful ignorance of much which only twenty years of hard practice and unceasing labor have taught. With each year our enthusiasm for our profession increases; and yet, it is with a sense of modesty that we venture to give some details of our experience.

Without reference to the favorable or questionable results that may follow the filling of teeth with the various materials now in use, we simply would call your attention to the special cases where gold is employed.

A word, first, upon the *detection* of *decay*. We have so often seen mouths fresh from the hands of the operator—and, judging by the work, the professional brother was skillful in manipulation—in which all easily accessible cavities were carefully attended to, yet, alas! the patient dismissed with the most important work neglected. We have seen the patient discouraged, and incredulous, too, until we have proved by actual demonstration the existence of decay.

How frequently whilst engaged upon a mouth we are surprised by the discovery of defects that on first examination we had not suspected! We have had teeth pronounced sound by one operator reveal to our closer scrutiny a highly decomposed condition.

Now, if we have a right comprehension of our professional responsibility, our first duty is to detect decay. The turned point of a nerve-broach should be well used, and, when there is any doubt, the operator should not hesitate in resorting to the revolving disk,—so cutting the teeth as not to destroy the contour, if possible; and yet, better cut than remain in doubt.

We have seen teeth miserably filed by English barbers long years ago, though unsightly, still good; and the saw-shaped teeth of the fashionable South-Sea Islander are well known for their soundness.

We are not advocating the unnecessary cutting of teeth, and urge that the greatest judgment and skill should be exercised; but we are advocating that the search for decay should be made with unfaltering perseverance.

The wedge may take the place of the disk, and very properly, too. Wedge and disk are both necessary and safe accessories in skillful and careful hands; and patient observation whilst engaged upon a mouth will often surprise us into new lines of labor that hurried inattention would never discover. We have cause to congratulate both ourselves and patient when our search reveals only perfection.

And now for the preparation of cavities; and here should be the extreme test of skill, for although recent inventions have lessened labor, they only seem to increase the necessity for skillful manipulation and conscientious care.

Not long since we saw it stated in one of the dental periodicals that "the engine had been the cause of many exposed nerves." With regret, then, we must answer, the engine has caused the exposure of bunglers and careless manipulators. A nicety of touch is indispensable, and not the engine, but the operator, is in fault when a pulp is needlessly exposed. In the use of this beautiful assistant engineering skill is requisite.

Another suggestion may not be misunderstood, viz.: Our appointments must not clash; time must be allowed. Quick work is well enough when the purse alone is considered, but, in cases (which frequently occur) where two or three cavities can be better prepared at one sitting,—that is, when better work can be accomplished by thus giving room and light,—then time, undisturbed time, is of the utmost consequence. Rather than over-weary the patient, however, one sitting may be given to the preparation of the cavities, and another for the introduction of the gold; the cavities during the interval being filled with creasote and mastic.

Let us take an example. Notwithstanding we realize the difficulty in properly demonstrating by words that which would be so much clearer in hand, we will endeavor to give you our own "modus operandi" as clearly as possible.

Let us, then, take, for example, the anterior proximal surface of the first superior molar, which is found defective, also the second bicuspid on both anterior and posterior proximal surfaces, embracing that portion of the crown between the cusps; and so, correspondingly, is the first bicuspid defective. Examination betrays these cavities as extending beyond the margin of the gum, and decay so advanced that, to make perfect work, we feel the necessity for seeing clearly all sides of each cavity. To attain this, we begin with the disk and separate well, the line of separation extending from the cervical walls; separating first the second bicuspid and first molar, then the second and first bicuspid, then the first bicuspid and cuspid. This opens up our work. The next step is the application of the "rubber dam" to the four teeth.

Here we have surmounted a difficulty that at first we felt was discouraging, but practice has made us expert in its application, and to-day we apply it more readily, and with greater facility, than we did the napkins of olden time. Now that the rubber is securely adjusted, we can carefully look at the work before us. We excavate then the first bicuspid, and can see our way clearly to the anterior proximal cavity in the second bicuspid. Pleasantly surprised with our success so far, we proceed to excavate the second bicuspid, and with its completion we have an unobstructed view of the anterior cavity in the molar. So with comparative ease is the excavation of this accomplished.

In actual practice, we should at this juncture apply the temporary fillings and release our patient, being very willing to postpone the introduction of the gold for twenty-four hours at least; but with your kind indulgence we will insist upon this patient sitting still, and proceed with our work.

Look once again at what is accomplished. Of every portion of each cavity we have an unobstructed view, and this is the advantage we wish to hold until the conclusion of the operation; therefore we begin first upon the cervical wall of the molar cavity to introduce the gold. Our retaining-points have been secured without difficulty, and the little camel's-hair brush has swept everything clean before us. Our speculum is gently adjusted so that the cavity appears in the front of the mouth rather than in the molar.

With ease and rapidity we begin upon the cervical wall of the molar cavity; but before building too high, we turn to the cervical wall of the posterior cavity of second bicuspid and progress with equal facility, until a firm foundation is secured; then, resuming the filling of the molar, we complete it to our entire satisfaction, and smooth the surface a little, so that the gold may not adhere as we proceed with posterior second bicuspid cavity, which is soon brought along to that part of the cavity lying between the cusps.

The anterior cavity is then taken in hand; our work all the time becoming lighter. These two fillings are united by the crown, which is then the key that locks each of the others in their places. Only the first bicuspid remains. We begin on the cervical wall of its posterior cavity, and work as smoothly as oil. The result gives us unqualified pleasure, for there has been no hitch anywhere; not a drop of moisture. Our patient has actually taken a glass of wine during the operation, and the monotonous tones of the light steel mallet—delicately used by our skillful Japanese—have put our patient to sleep! whom we awaken with the good news that the work is finished.

In the case that we have had in mind in this statement, the walls of the cavities were so thin we were compelled to cut them away to secure permanency. The question arises, Shall we make contour fillings here or not? We know of no other answer save that this must be left to the judgment of the operator.

Contour fillings at times are inadmissible, again at times they are necessary, but in the case just described well-rounded fillings, without any attempt at contour, were considered the most advisable, leaving them self-cleansing,—that is, with the V-shaped separation,—which in cases of proximal fillings is mostly the best rule; since the introduction of the rubber dam, the cervical walls, despite large festoons of gum, can be so left that food will not crowd between the teeth, thereby rendering the separation objectionable. When such inconvenience occurs, we unhesitatingly pronounce it the fault of the operator.

The finishing and polishing of these fillings are so simplified by modern improvements, it would be superfluous to refer to them. It not unfrequently occurs that both light and heavy gold are used in the same cavity; also a thin flowing of oxychloride is made before introducing the gold.

Personally, we have for a year or two constantly employed heavy gold, never using under No. 20. Laminated fillings of heavy foil seem to us the best, the gold being moderately adhesive. This statement is made with all due respect to those of our colleagues who constantly employ light foils, and whose lasting and artistic work is the best evidence in their favor.

The imperfect description that we have thus given is the way we treat seven cases out of ten, when the condition of the teeth and patient warrant such a "clean sweep." We know it takes time and scrupulous attention, but the result is most beautiful.

Should the teeth be hyper-sensitive, excavating with the rubber dam facilitates the work and is a relief to the patient, whilst an application of creasote or carbolic acid, with mastic as temporary filling, has a tendency to reduce the highly sensitive condition of dentine.

And now a word, in conclusion, in regard to the dread attending dental work.

Kindness and forbearance are the indispensable characteristics of a true dentist. An observing physician has an intuitive, sympathetic knowledge of his patient, and works accordingly. Even the most nervous will submit without complaint to the removal of the most sensitive dentine by the hands of such an operator, when they could not be induced to enter the office of another.

Our rooms, too, should be so arranged as to take away the suggestion of pain: not making anatomical museums of our offices,—exposing instruments, etc. We have no objections to dental museums, but let them be in rooms set apart for the purpose, not where the trembling patient can connect them with anticipated horrors.

We have even sent away our famous dental chair, and operate at a little easy parlor chair, sitting beside our patient on a low, light, cane-seat stool. Nearly twenty years we stood by improved dental chairs, but find the change we have mentioned far more convenient.

Our office presents the appearance of a pleasant sitting-room or library, and the pleased smile of our patients well attests their astonishment and gratitude; whilst "that awful chair!" is a remark we never hear.

ON THE USE OF TIN AND GOLD COMBINED.

BY J. PAETSCH, M.D., D.D.S., BERLIN, PRUSSIA.

(Read before the American Dental Society of Europe, at Hamburg, August 4th, 1875.)

I ASK permission for a few words relevant to what Dr. Abbot has said concerning the merits of tin and gold combined as a filling. I have frequently used them as recommended by him, more especially in cases where I have been obliged to work rapidly, as in children's mouths, where I could not keep the filling free from saliva.

I use it also in difficult cavities in mouths of delicate patients, to whom it is a great trial to sit quietly for even a short time. I am certain that the tedious operation of putting in a correct gold filling, "*lege artis*," does patients of this class more harm than good, when we can insert tin and gold, which preserve the tooth quite as well, in a much shorter time. A patient who would fall asleep during an operation, as we yesterday heard, I have never seen.

I am sorry to say, gentlemen, that our profession too often commits the fault of not sufficiently considering the characteristics and comfort of our patients. Engines have been invented to cut out caries; the mallet is used; these, with other useful appliances, in the hands of an experienced operator, are blessings; but when not used carefully, they may become instruments of torture to patients. I have frequently seen these instruments used more for the convenience of the operator than the benefit of the patient. I have frequently seen good operators make gold fillings for very delicate patients, who were compelled to suffer for hours. I am sure that the same could have been made in much less time, and the teeth have been preserved quite as well—perhaps better—by using tin and gold. I say "perhaps better," because such a tooth requires, for a gold filling, so much time and so much pressure, that besides the other disadvantages, inflammation may follow. It is not the first requisite that we should make as fine a piece of workmanship as the goldsmith. Our first task is to preserve the tooth, at the expense of as little pain and discomfort to the patient as possible. If, besides this, we can superadd fine workmanship (as we, fortunately, can do in most cases), so much the better.

In operating with tin and gold (and I beg you to note, gentlemen, that during the six years I have used these materials combined not one of my patients has ever experienced the slightest pain or trouble from galvanic action), I have found them a much poorer conductor of heat than gold alone. In the winter season, when my patients have complained of an uneasy feeling in those teeth that had been filled with gold, they have *not* complained of those in which the combined metals had been used, although the latter were more involved in decay. It was the observation of this fact that led me to put a stratum of tin and gold in the bottom of very deep cavities, where the caries has approached very near the pulp-cavity; then build the gold on this as a base. An excellent filling is the result, and the patient does not complain of pain attendant upon changes of temperature in the mouth.

In addition, there is this great advantage: such a filling can be made in half the time that the gold alone would require.

Let me ask your attention to a few remarks about amalgam. About two years since I had the misfortune, while finishing a very large gold filling in the second left inferior molar, to break off the back part of the lingual wall (a mere shell). The remaining portions of the walls were so thin that I was fearful of further breakage in impacting gold by mallet or pressure; and, as the patient was somewhat exhausted, I drilled a few undercuts in the lingual surface of the gold, and covered with rather dry amalgam. The next day it was polished. I happened to see the patient a short time since, and had the great satisfaction of finding the tooth perfectly safe, without discoloration, while the amalgam was as bright as silver and the gold untarnished. The patient has bequeathed that tooth to me in her will.

I believe it wrong, even cruel, to subject patients to unnecessary fatigue in attempting to fill a tooth with gold (in a case like the foregoing a doubtful operation at best) when amalgam can be used with such results; and certainly greater success could not be attained in a tooth with such frail walls, with a filling made so quickly. I trust it will not again happen that I shall believe the walls of a tooth capable of bearing more than ought to be expected; but should such a mischance occur, I shall use amalgam in the same way.

"D.D.S."

BY J. FOSTER FLAGG, D.D.S.

(Read before the American Dental Association, August, 1875.)

Gentlemen of the American Dental Association,—It is with no ordinary feelings that I enter upon the discussion of the subject of dental education. I stand, as it were, spell-bound, as I look back upon the vista of almost thirty years of professional life.

I had thought, until recently, that the lot of dentistry had long since been chosen.

I had thought that the deep plowshares of the sturdy veterans of the Baltimore Dental College had turned the sod for the cultivation of a new profession.

I had thought that I was one of a great, *united*, band of workers, whose hearts were in their hands; whose faces had never turned back; who counted toil as naught; who worked and thought and fought for dentistry.

So full was I of this, that the old-time settlement, by medicine, of the status of the dental art had come to be a *cherished* by-gone. Cherished as the act by which we were indeed made free; cherished as the sting which goaded Harris, Haydn, and their compeers to such herculean efforts as gave birth to that which seems to-day incredible; cherished as the source from whence, *unwittingly*, has sprung so much development, that we are justly proud of it.

All this was less than forty years ago, and even now are present those who well remember *how* it was that Dentistry was born and honored with a "title."

Long and earnest were the councils when this work was done; slowly, cautiously, was each step taken; anxiously, hopefully, was launched the ship upon the waters; and nobly has it floated onward in its course from then till now.

And has it stopped? Has progress ended? Has everything been done that can be done? that now we, ever and anon, are greeted with a cry for "help!" *For help from Medicine!*

In what *would* Medicine give help to Dentistry? In what *does* Medicine give help to Dentistry? In what *could* Medicine give help to Dentistry? I do not ask these questions thoughtlessly, arrogantly, captiously, but thoughtfully, seriously, earnestly. Medicine may be the lion, and Dentistry, yet, may be the mouse; but if I well remember, it was the mouse that helped the lion. I don't just now recall the help the lion gave the mouse.

For quite a time, in years gone by, the Æsculapians discussed the worth of Dentistry, and then found "nothing in it."

Nothing to give it merit worth an education *at their hands;* nothing to give it status *worthy their consideration;* nothing to give it claim to *their association.*

And now, has all this changed? Have we, by what we've done, proved merit *worth a liberal education at their hands?* Have we, by forty years of labor, made a status *worthy their consideration?* Have we, by work, by study and success, at last established claims which warrant the conferring of that "*opportunity for broader base*," which, having been accepted, shall entitle us to *their association?*

Away with this! It seems to me as more than foolish. It seems to me to taint of ignorance regarding that which we, of all men, should have knowledge of,—the breadth and power of Dentistry.

Its breadth is such that no one *dentist* that I know hath arrived to compass it,—its almost inexhaustible power for doing good is hourly taxed and hourly *demonstrated.* No theoretic dosing, no compounding remedies for weeks and months to try first this, then that; but something done,—a *something* drawn from resources so varied and diverse, that not to give it separate existence is but to stultify it.

I have no fear in the enunciation of these views; no fear that I shall be regarded as an opponent of *progress;* no fear that I shall be accused of narrowing education; no fear that I shall clog the cherished interests of Dentistry; for, if my record in regard to these has not been made, I cannot now begin.

For thirty years I've watched the progress of my loved *profession.* For thirty years I've seen each year fresh proof of individuality. For all these years I've felt the *emulative* spirit, which has grown stronger and stronger in the heart of Dentistry; full of a yearning for better things; full of an energy for higher works; full of a zeal for achievements which should rival those of other callings; but until now I've never heard that over all, beyond all, above all, was a great goal which could alone be reached by *loss of our identity!*

What argument is there in the *assertion* that dentists *must* be medically educated?

What truth or force is there in the *assertion* that this is a foregone conclusion?

What reasonable inference have we that this would even be *desirable*, not to say *markedly advantageous?*

Is it that our best practitioners are medically educated; and that they are our best practitioners *because* they are medically educated?

Is it that our worst practitioners are not medically educated; and that they are our poor apologies *because* they are not medically educated?

Is it not the fact, on the contrary, that many of the very brightest from our ranks are not otherwise than dentally educated? and is it not true that year after year witnesses constant accession to the number of those who, medically educated, have felt most woefully the absence of that knowledge which alone they could rely upon?

I will not speak to you of the average medical practitioner. I esteem him as a man; I associate with him as a gentleman; I respect his average attainments. Of him I will not ask, but I *will* ask of the erudite of medicine; I *will* ask who, of all their professorial corps,—which one, among the most distinguished of their teachers,—could stand, with credit to himself and comfort to his patient, *five little minutes* at the dental chair?

And why is this,—that I can ask, but none can answer?

It is because the two great branches of the healing art are Medicine *and* Dentistry. Medicine, first, oldest, and grandest, if you please; Dentistry, second, youngest, and least, if you please; but none the less Medicine *and* Dentistry,—distinct in their mixing as are *oil* and *water*, the emblematic fluids of the two professions!

Year after year the lines of demarkation have become the more apparent,—methods, appliances, and rules for practice which pertain to one, are unknown, unheard of, by the other; subjects may have a vital interest for the medical man and yet possess but slight importance for the dentist; while all-absorbing questions for the dentist have not that interest to the general practitioner which can secure for them even a passing glance.

It is *this* which has caused the drifting apart of the two professions. It is this which forms societies of dentists; this which gives rise to dental colleges,—institutions, which, with all their faults, I here assert have done as much for Dentistry as medical colleges have for Medicine.

It is this which has called into being the very organization which I now address, an organization which lives only in the *representation* of Dentistry, and which would die—*if it could be killed!*

It is this which has made our literature, both text-books and journals. What are they to general medicine? That they are valuable contributions to scientific information I think will not be denied; that they have been productive of an immensity in the direction of alleviation of human suffering cannot be gainsaid; and yet, what are they to general medicine? and, on the other hand, how the great volumes of medical lore have poured out, thick and fast, like volumes of smoke! And what are they to Dentistry? If they but touch it,—*even the best of them*,—the teachings are the laughing-stock of our profession.

The medical press indulges at times in satirical criticism of such magazine articles as we ourselves are ashamed of; but I very much doubt if they often experience, in the perusal of recognized dental literature, that pity and contempt with which we frequently view the accepted efforts of their very best men when they leave their legitimate sphere and enter upon our domain.

It is in the nature of things that this should be so. I do not believe even in co-partnership between Medicine and Dentistry,—to say nothing of the patronizing adoption of the one by the other.

In a co-partnership, the union would be that of age with youth,—it would be that of the established with the progressive,—it would be that of the dictatorial with the defiant of control. It would be a *mixture*, and never a compound; a mixture well represented by a medico-dental faculty; a mixture which would indeed have to be well shaken when taken, in order that its components should appear as one united medicine.

Well do I remember, in the earlier days of my professional life, the universal tenor of the general practitioner toward the dentist in cases of "consultation." The whole bearing was that of conscious superiority. But of what did the superiority really consist? It was merely *superior ignorance*. As in the "consultation," if the patient had dental difficulty, the dentist knew something about it, while the general practitioner *knew nothing;* and if the patient had no dental complication, the dentist was aware of the fact, and the general practitioner *was not.*

Gradually all this has changed, at least with representative men; and now, from the real workers in the medical ranks, instead of consultations, or ridiculous demands, such as for devitalization of pulps in pulpless teeth, or the extraction of sound and eminently useful roots for the relief of ophthalmic irritation, we have requests for examinations, and information as to whether or not there may exist any dental lesion.

This is as it should be; for, while I think we could not work as one, I nevertheless see no reason why we should not work harmoniously, and as we are working, *advantageously*, as *two; desiring no recognition* except just that to which each is entitled; desiring NO EQUALITY except that which springs from courteous intercourse and the mutual benefit we give our fellow-men; desiring no association, except as co-workers in the great cause of humanity; and leaving to time and the efforts of each the settlement of the "status" of the two professions.

It seems but proper that a few words should be given to the grounds upon which seem based the idea that Dentistry is a specialty of Medicine.

It is because a part of Dentistry is devoted to the treatment of the diseases of the teeth; and because, in the prosecution of this specialty of our profession, the principles of practice are those which underlie that of general practice.

Equally with any other, I think, without arrogance, I may say that I should recognize this.

Having made this seemingly connecting link between Medicine and Dentistry my special study, and impressed, as I am, with the immense importance of its cultivation, I may be allowed to say how little, how very little, of the practice of Dentistry is comprised in this.

A dentist may be, of all others, most capable in this direction. He may bring to bear upon it all the information gained from the most extended medical education. He may have all this increased and rendered useful by "*special*" dental lectures upon these subjects, and yet he may be so inferior a dentist as to be utterly unable to render all this erudition of much value to his patient or, in much degree, creditable to himself.

A vast fund of information, experience, and practical dexterity, which can in no wise be regarded as in the least "special" to medicine, has to be drawn upon before the great good of a permanent benefit is bestowed.

Lectures upon these subjects are not called "special" Operative Dentistry, and "special" Mechanical Dentistry, because they are the embodiment of those attributes which give it the distinctive features of a "calling;" and if, in addition to these distinctive features, there have been adaptations from pathology, from chemistry, from metallurgy, mineralogy, and physics, to such extent as to warrant the necessity for so liberal an education as to have invested the calling with a dignity derived from knowledge, *it is thus that we have made it*—A PROFESSION.

This brings us, in conclusion, to the question of Dental Education.

That the dental colleges as now constituted are all we need no one can for a moment think; but that any advance would be made by the engrafting of dental chairs upon medical colleges, I gravely doubt.

I do not doubt this theoretically, but from a practical knowledge of the working of the schools.

I know that the position of the dental element in such arrangement is subordinate.

What valid reason is there why Dentistry should be subordinate to Medicine,—any more than that Law or Classics should be subordinate? And yet these have their distinct "degrees," though taught within the walls of one great university. It is *easy* to declare in favor of the abolishment of the degree of D.D.S., but it has been *hard* to gain for it that distinction which has already given it a recognized acceptation by the whole civilized world. What is the first practical gain in this direction? Is it so great a glory to *substitute* the D.M.D. for D.D.S.?

It is easy to say that one degree in medicine is enough, for no one will deny it; but to say that the "greater" *covers* the "lesser," is an assertion which, to say the least, is disrespectful to a degree which has earned for itself the right to be highly respected—and which is *not yet covered.*

With what arrogance has it been asserted that the degree of D.D.S. is one of partial culture! and with what sycophancy has it been intimated that the degree of M.D. is one of desirable fullness!

For me, if my degree only impresses me firmly, constantly, unwaveringly, that it *is* a badge of partial culture, and thus prevents the feeling that I am possessed of "desirable fullness," I shall never cease thanks giving that I am a D.D.S.

Therefore, if Dentistry is taught within the walls of any classical or medical university, its degree should either be M.D., with its desirable fullness, or else be D.D.S., with its respectable signification, and thus take rank with A.M., L.L.D., Ph.D., D.D., and other badges of partial culture.

But what of *our* work?—as members of the profession of dentistry, it should be ours to rally in solid phalanx to the support of those means which have already done so much for us.

The sources from whence have flowed such streams cannot suddenly have dried; they must be nourished, cheered, and strengthened; not that they have not done well, but that they may do even better; not that their teachings have been lame and impotent, but that they may rival those of the best instructors in each and every department.

Our colleges, our journals, our associations, and our societies should each and all have our good words and deeds. Our intercourse should be characterized by urbanity, liberality, and, above all, *professional* courtesy. Our aim should be that individual *esprit de corps* which must result in never-ceasing progress.

We must try to cultivate unity of purpose. We must try to maintain ever in view the pathway we have thus far so prosperously trodden.

We must eschew all changes which offer us short roads to high positions, and rely unfalteringly upon the faith, that *worth will win the day.*

PROCEEDINGS OF DENTAL SOCIETIES.

THE AMERICAN DENTAL ASSOCIATION--FIFTEENTH ANNUAL SESSION.

(Continued from page 486.)

SECOND DAY—*Morning Session.*

THE association was called to order at the usual hour, the president, Dr. Dean, in the chair.

The subject of "Physiology as related to the Health of the Dentist," was still under discussion; Dr. John Allen's paper being the basis upon which the discussions proceeded.

Prof. Taft said that a few years ago most of the prominent workers in the profession were broken-down men. An improvement, however, is visible in the last few years. The confinement to which the dentist is subjected is bad, the position he occupies in operating is bad, the inhalations are injurious. We ought to study all these things which pertain to the health of the dentist. The work of the dentist is physically laborious; it does not require muscular energy to so great an extent as rail-mauling and using the sledge-hammer; but it requires the holding of a steady hand; a steady and persistent effort running through the whole day is necessitated. The attention must be riveted; and the mental strain is very great. The surgeon feels exhausted after a short operation only. The two efforts, physical and mental, when prolonged, induce very great exhaustion. Other occupations require only one of these two methods of application; some require physical effort only, others mental. We should strive to prevent this being carried to an extreme. The attention should be diverted; something should be chosen that will wholly draw off the attention. Let the change be great, and the employment chosen wholly diverse. Fresh air, rest, freedom from strain and stress, must be provided. The incompatibility between patient and operator, which was spoken of yesterday, tends to break down the dentist.

Dr. Morgan. Some time since this subject attracted attention in the Mississippi Valley Association, and he (the speaker) had offered a reward of two hundred dollars for an essay on the diseases of dentists and their remedies. Dentists are peculiarly subject to renal diseases, hemorrhoids, and chest diseases. Many avoid the strain upon the abdominal muscles by sitting while operating; and he is glad to know that this is so. A constant strain is more exhausting than a much more severe one for a short time only. Men who can raise forty or fifty pounds at arm's length with ease, will break down if required to continue to sustain only ten pounds. This, the chief cause of the dentist's breaking down, is the result of just such constant tension, which does not occur in other occupations. There is too little attention paid to ventilating our offices. If we could have sunshine it would be better, but it is not often possible. He had once lived twelve years in the country on a little farm, but afterwards removed to the city, and in a short time was a broken-down man. He took the alarm and resumed a more active life, riding in summer from six to eight o'clock in the evening, and had been benefited by it.

Dr. Barrett (N. Y.). What is to be done with patients with whom we can establish no proper nervous relations? There are patients whom we dread to see come into our offices; others again we can labor over all day and not feel it. There is some mysterious vitality which we do not understand. Till we can, as it were, discover the difference between death and life, till we can discover some means of preventing this influence, we must go on and be robbed of vital force.

Prof. Taft refuses to operate for incompatible patients. No cultivation will bring about compatibility. These patients, however, will form proper relations with other operators, and he sends them to others. He had noticed that patients sometimes "feel first-rate," while the operator is wilted out. Sometimes quite the contrary is the case. If he suffers from one night's insomnia, he inquires closely into the cause, and usually succeeds in finding and removing it, so that he rarely misses the second night. Ordinarily, the trouble may be removed.

Prof. McQuillen. If every one should refuse to operate for the incompatibles, what would become of them? What would be thought of a physician or a surgeon who refused to attend a patient on account of incompatibility? It is a confession of weakness to talk this way. There is often more incompatibility on the part of the practitioner than of the patient; exacting of the latter unflinching patience and endurance under the most painful operations without any manifestation of sympathy, and, when the slightest shrinking or resistance is made, giving by word and action unmistakable evidences of temper. No man can expect to control others until he has obtained the mastery over himself. Rarey conquered a horse that had been pronounced untamable in an incredibly short time by exerting his peculiar influence over him. We should control our patients not by brute force, but by kindness; making such an impression on them that they will feel there is a magnetic power they must submit to. It is through the heart that the incompatibles can be reached; a kind word, a sympathetic look, and a pleasant manner will enable a patient to submit to the most painful operations at the hands of a man of feeling, who would not tolerate the touch of another who lacked that essential quality. The operator, in fact, should have that command over himself which will enable him to control the most refractory patients, and at the same time manifest a gentleness of manner which will support and encourage the most timid, or he is not entirely fitted for the practice of the profession.

If anæsthesia is but privity of oxygen, as maintained yesterday, how is it that nitrous oxide and chloroform act so promptly that the effects are manifested almost instantaneously, while pearl-divers can remain under water deprived of air other than that in their lungs for two or three minutes? We do not expel all the air from the lungs in expiration or thoroughly inflate them in inspiration. The quantity that is uniformly changed in ordinary respiration is named *breathing air*. What can be drawn in over and above this in the deepest inspiration is called *complemental air*. After ordinary expiration, such as that which expels the *breathing air*, a certain quantity of air remains in the lungs, which may be expelled by a more forcible and deeper expiration; this is termed the *reserve air*. A certain quantity still remains over which there is no voluntary control, and this is called the *residual air*. When the lungs have been once inflated, no force can remove all the air from the cells. The hydrostatic test for infanticide is founded on this principle. Cutting off the air, as in drowning and hanging, will undoubtedly produce insensibility or narcosis, with the possibility of resuscitation, but this cannot be regarded as evidence that anæsthesia is not due to the agent employed acting as a poison directly upon the nerve-centers, rather than by an arrest of the oxygenation of the nervous mass.

He had known from personal experience what insomnia or wakefulness meant. In former years, under the pressure of varied duties as a practitioner, teacher, and editor, in order to get through the work that crowded upon him he had been compelled to sit up late at night and rise early in the morning, and not unfrequently the entire night had been passed in his library hard at work. To do this he had used coffee and wrapped wet towels around his head, to drive off the tendency to drowsiness. After a time sleep, which had thus been driven away, could not be obtained when it was sought for. And night after night was passed without it, and even when it came it was accompanied by dreams, in which the mind was actively engaged in the labors of the day, with a tenfold exaggeration of work and attendant annoyances and difficulties.

Insomnia is due to an engorged condition of the blood-vessels of the brain, and this can only be corrected by restoring the normal equilibrium of the circulation in every portion of the organism. Exercise in the open air, walking, riding, swimming, and particularly a current bath at Niagara (in which you take hold of a stout rope with both hands, and then the body vibrates upon the surface of the water like a flag in a stiff breeze), will send the blood tingling to the extremities, and enable one to sleep soundly. This is far better than to have recourse to the use of drugs. Bromide of potassium has, however, been strongly recommended by Dr. Hammond for insomnia. He says it acts like a charm, diminishing the amount of blood in the brain, and allaying any excitement of the nervous system that may be present in the sthenic form of insomnia.

Dr. John Allen is glad to see that this subject is being discussed, and desires to see a spirit of inquiry manifested. The proportion of deaths by insanity in other professions is far less than in ours, as he has ascertained by inquiry, and there must be some cause for it, which we must find out. We must study nature's laws, and as we can't amend or alter them, we must conform to them as nearly as possible. Temporary relief may be obtained from stimulants, but just so far as these elevate the system, so far it falls below in their absence. It takes more and more, and moderation cannot be commanded.

Prof. Shepard has not observed the tendency to insanity among dentists to any such extent as described in Dr. Allen's paper. There are many old men in the profession; one in Boston seventy-five years of age is in active practice. It may be admitted that this class of men do not do as good work as younger men; that is impossible; but they are well men. Many men in mercantile pursuits are taken to the asylums from perplexities of business, but he cannot recall an instance of insanity among dentists. A large majority of them are well men comparatively. The reason that so many of the profession are young men is, that thirty years ago our numbers were small. It is a question whether the practice is so depressing upon life-force. Overwork will bring its legitimate result, and those who have fallen within his knowledge have done so from overwork. One esteemed brother, deceased just previous to our last meeting, worked till 3 A.M. in investigating, and carried on a large practice; and on the morning of his death was at work upon an article for this association. The great secret of keeping health is the enjoyment of it, and of one's business; and a man who does not enjoy his profession and go to it with pleasure in the morning, cannot accomplish the best results with the least expenditure. It is the high motive, the idea that one is doing good, that will sustain; the further from the idea of money one can get, the greater pleasure he will find in his work, and the greater immunity from declining health.

Dr. Barrett thinks there is a greater drain upon dentists than upon other professions. It is not the refractory patients that are most exhausting, but those that settle down and draw and draw till we sink down exhausted. No dentist could keep this up as long as the physician can his exertions.

Prof. Flagg is in sympathy with Dr. Barrett. We must make an effort to control patients. He had often diminished the magnetic current by interposing folds of napkins between himself and the patient.

It is the contact of skin with skin that does the mischief. Disagrees with Prof. Shepard; there are old men in the profession, but they are easy-going ones; are there any delvers seventy-five years old and in the harness? There are perhaps exceptions, but they are the Von Humboldts. Our calling produces more drain in every direction than any other; it is the constant effort that breaks down, and the love of it does it more than antipathy. Agrees with Prof. O. W. Holmes that it were better for mankind if all the drugs (as they are used, or rather abused) were in the bottom of the sea, and all the worse for the fishes! Protests against the use of the bromide of potassium. It is a treacherous drug,—very good for a few times, but "plays out," and leaves the patient in a deplorable condition. Assafœtida is about as good as any drug for both patient and operator; it is safe and may be used continuously. They sugar-coat pills to make them pleasant, and we must sugar-coat our operations. Mingle gentleness with firmness.

Dr. Allen's paper is admirable, and takes irrefutable ground. We overtax ourselves, not as business men do, in the inordinate exertion to make money, but in the legitimate practice of our profession. We break down in an average time of eight years. Rest and a change of occupation are what are needed.

The difference between sleep and anæsthesia is subtle. Sleep is not unconsciousness. Sleep is recuperative; unconsciousness is another thing. In sleep there is turgescence of the brain, but in unconsciousness there is an anæmic condition. When a man dreams of things he has been doing during the day, he had better stop. When we wake up from sleep we feel refreshed, but there is no refreshment from anæsthesia. There is always danger in this condition. The speaker is a strong believer in anæsthesia; it is one of the greatest boons ever given to suffering humanity, and *we* gave it to the medical profession, which we are all the time helping to the best of our ability. It is a boon, but, like other powerful agents, may be and is misused. As in the use of arsenic, it is said that only a little is used; gentlemen say they never give it to unconsciousness; but it must be understood that when a patient is only partially under its influence, every nerve is fully aroused, and the pain is more severe than ever. Believes that the nervous mass is affected, and the sooner it is done the better it is. The first sense lost in anæsthesia is that of smell; and it progresses in regular order. When the pons varolii is affected it is a most critical condition,—one next to death. It is not wonderful that when patients have been thrown upon the bridge of helplessness, and then operated upon and tortured, there should follow headaches, insomnia, and hysterics. The daughters of leading medical men are in the same condition.

Dr. Atkinson. All that has been said in regard to nutrition has referred to the blood. We fail to see that these are misnomers. The polarization and depolarization are not immediately affected by the breathing of oxygen. He was delighted with the manner in which Dr. Flagg dealt with the subject. We deal with concomitants and not with causes. We have no right to say that we know anything about causes. Anæsthesia and sleep are different,—one is normal and the other is abnormal. When all the oxygen is taken out of the system it is dead. Any agent may be food, poison, or remedy according to the tension of polarity. Do not throw the remedies to the fishes, but throw away our misapprehensions about remedies. We must not take extreme views. What is temperament? Only a polarization of currents. We must oppose kindness to unkindness, be master of the situation, and do good, irrespective of money. We must control our patients; not by the Rarey method, however, for we can't always choke them down.

Prof. Taft wished to correct a possible misapprehension; he did not mean irritability when he said incompatibility in regard to patients. The sluggish patients who manifest no opposition are often the worst. They are repulsive to the operator, and they have the advantage of us, for if the operator was repulsive to them, they would seek some other one. An irritable, fussy patient *may* be brought down if we have the power to do it, but the other thing is a different thing. Do not think you can dominate all patients; you will be exhausted and broken down in proportion as you do it.

The subject was then passed.

The Executive Committee made a report, recommending that the afternoons be devoted to clinics, which was adopted.

The report of the Publication Committee was read, and the committee were instructed to publish the Transactions for the present year.

The subject of "Pathology and Surgery" was postponed, and "Histology and Microscopy" was taken up.

Dr. Taft read a report written by Dr. W. H. H. Jackson, of Ann Arbor.

The writer stated that in making microscopical investigations of hypertrophied cement, he had been struck by the frequency with which atrophy occurs in connection with it. There are constant changes in the intensity of the two vital forces which build up and tear down the tissues. In a normal state these forces balance each other, but if either gains the ascendency, we have hypertrophy, or atrophy. Through these alternations we are able to prove that the osseous system renews its tissues,—though not so rapidly as the soft parts do. Teeth are often found to have changed from soft and tender, to hard and strong. The lamination of hypertrophied cement shows that there are periods of activity and cessation, as well as places of greater activity of action. Wave-lines show the extent of these actions.

In investigating, the writer had noticed that the bone-corpuscles were most numerous at the beginning of each stage of activity, and at the points of most rapid growth. What function do these corpuscles fulfill? Are they necessary to the structure? and if so, why are they sometimes absent? Or are they results of pathological conditions, or masses of periosteal tissue enveloped in the rapidly developed cement?

The writer is inclined to the latter position. Too little attention is paid to the minute anatomy of the teeth; attention to it would save injuries and pain. We should work with great caution in excavating the incisors, as filaments of the nerve often extend far into the dentine.

The transverse grooves found on teeth have two distinct characters, —those with rounded edges being formed during the development of the teeth, either as a pathological result or from varying intensity of action of the formative process. The second class with hollow edges is the result of chemical action of the secretions of the mouth.

Prof. Stricker, of Vienna, has been making some interesting observations on the pathology of suppuration. He concludes that pus-corpuscles are formed by the division of the cells of the injured or diseased tissue.

Dr. Taft then read an additional report written by Dr. E. D. Swain, of Chicago.

The committee reported a decided barrenness during the year,—quite in contrast with the few years preceding. Certain observations conducted by Prof. H. S. Chase, the results of which had appeared in the *Missouri Journal*, were alluded to. The committee had examined Prof. Chase's specimens for themselves, in company with Profs. H A. Johnson and J. W. Danforth of Chicago, both histologists of high repute. They found that they presented the appearances shown in the drawings, though not quite so markedly. The bead-like appearances were well defined, and the specimens numerous. All the teeth were taken from persons under seventeen, before complete development had taken place. Prof. Chase advanced the theory that the tubuli had been formed by a linear arrangement of the cells, the proximal ends being absorbed, this process continued forming tubuli. He also claims that the nucleus still remains in the calcified cell, retaining vitality which enables it under proper conditions to renew its action, and that through this vitality the changes which take place in dentine occur,—such as absorption of dentine from beneath a perfect gold filling uniting the pulp-cavity and cavity of decay. Prof. Chase claims that calcification and decalcification take place in teeth, and that the animal portion may be removed without chemical action.

Though the appearances are doubtless present, yet they do not establish the theory; it cannot be considered proved till Prof. Chase shall demonstrate the presence of the nuclei.

Mr. John Tomes has called attention to the appearances observed by Dr. Chase. In his work published in 1848, he describes the linear arrangement of the cells, their division and elongation, and the ultimate absorption of the proximal ends, thus forming a continuous tube; the intertubular spaces becoming filled with earthy matter, dentine is formed. The baccated appearance he ascribes to the preserved convexity of the cells, and a constriction at the point of junction.

It will therefore be seen that Prof. Chase differs from Mr. Tomes only as to the disposition of the cell-nuclei. His theories are somewhat different from the generally adopted ones, and stimulate scientific men to the most thorough investigation.

The report then described a very interesting case of a dentigerous cyst. A young lady, aged twenty-three, had her teeth extracted. The deciduous right cuspid was still present. After its extraction, the operator (Dr. Morse, of Richmond, Kentucky) observed an enlarged condition of the alveolus, and, supposing that the permanent cuspid was in the jaw or that the root of the temporary remained, applied his alveolar forceps and cut through. Examining the mass in the beak of the forceps, he found that he had extracted *sixteen* miniature cuspid teeth. The floor of the cyst revealed the sockets of several of these small teeth. The patient informed Dr. Morse that the permanent right cuspid had erupted as a "tusk," and had been extracted some years previous by her physician.

The committee had submitted these teeth to microscopical examination, and the results were embodied in certain photographs accompanying the report. They were found to be perfectly developed teeth as to enamel, dentine, cementum, and pulp-cavity.

The report then proceeded to consider the probable mode of development of these teeth, and arrived at the conclusion that the primary tooth-germ by gemmation produced sixteen daughter-cells, each of which became a tooth.

Adjourned.

Evening Session.

The subject of microscopy was still under discussion.

Prof. McQuillen said that he was glad to know that gentlemen were undertaking researches themselves. There is too much disposition in this country to rely upon the observations of Europeans. The microscope is too much of a toy with many. Micro-photographs are very fair, but cannot take the place of the microscope. Nutrition is not a subject for microscopical observation; it is too subtle, and we can observe its stages only. He had once honestly believed the doctrine of "*omne vivum ex ovo*," and taught it for years,—but is now a skeptic in regard to it. He is not prepared to say that the doctrine is false, but does not feel assured that it is true. We have had apparent beginnings of life from a formless fluid. If we should insist on the necessity of a germ to form a crystal, we should be laughed at by most; but the doctrine is advocated by some. If it is not true, it is reasonable that out of a formless fluid life is evolved *de novo*. The existence of the vegetable is dependent upon its obtaining fluids and gases from the inorganic kingdom. We live upon dead matter; the somatic and molecular life of our food substances is destroyed by cooking. When does it pass from dead to living matter? when assimilation takes place or before? In former times Owen regarded the process of formation in dentine as a centripetal calcification of the pulp. We recognize a series of cells arranged in linear form, which undergo a change, and become odontoblasts, having prolongations between which calcification takes place, forming inter-tubular tissue. We want the results of original investigations, but after a man has worked hard all day he is unfitted for such duties, and for that reason we have very little of it. Our institutions should be endowed, and so situated that young men of ability may confine themselves to original investigations, and then America may make its contributions to science as do England and Germany.

Dr. Atkinson. It is a pity that the best men know so little. We should be thankful that anybody knows anything. We deal with histology as we would if we should view an audience *en masse*, and attempt to describe it. We shall never know anything about life until we go to the bottom of the matter of function. There is a substratum denominated *atom*, which is the least manifestation of life that we know of. Atoms are endowed with life,—they can't be killed. We have been told that the molecular life of our food is killed. A statement like that is either a *lapsus linguæ*, or it shows an utter misapprehension of the subject. Atoms coalesce and manufacture molecules; plasma is an aggregation of molecules. Something must die that something else may live throughout the range of organic life. We have crystalline life, and below that granular life, molecular life, and atomic life. A crystal is regularly arranged granules that are regularly arranged molecules that are regularly arranged atoms.

The doctrine of inorganic or azoic existence will not do in this day. If we wish to know the origin of life, we must define the territory we are speaking of; when the conscious life has left the body, we have organic, cellular, and molecular life left, and that is the food which we delight to suck from the beefsteak. It is simply a polarization and depolarization of atoms that constitutes molecular mass. We cannot disrupt molecules without reducing to ultimate atoms; there is no such thing as death. Matter means mother. Every one who has followed me knows I have given as complete an answer to the question we are discussing, as that two and two are four. When the blessed love of the Father of light comes in and illumines us, we are endowed with the capability to perceive. The doctrine that "*omne vivum ex ovo*" is pretty old, as old as Harvey. If the protoplasmic mass is an egg, that is true; there are no bricks without mud,—there is no loaf without dough. What do Bastian's investigations prove? Only that these points are so small as not to have been detected before; they do not prove that the germs are not essentially eggs. What is an atom? It is in size about the two-hundred-millionth of an inch. If one side of it is warm and the other cold, there is polarization and depolarization, and that brings it to a point where freezing begins, and that is crystallization. When we have investigated deep enough, we shall be prepared to understand the processes, and they will be as plain as the freezing of water.

The subject was then passed.

(To be continued.)

AMERICAN DENTAL CONVENTION.—TWENTY-FIRST ANNUAL SESSION.

FIRST DAY—*Morning Session.*

THE twenty-first annual session of the American Dental Convention was held at the Ocean Hotel, Long Branch, New Jersey, commencing August 10th, 1875. At the proper hour the president, Prof. B. F. Coy, of Baltimore, called the meeting to order, and the Rev. Mr. Tompkins opened the proceedings with prayer.

Dr. J. G. Ambler, on behalf of the Committee of Arrangements, then delivered an address of welcome.

He alluded to the feeling of sadness which was caused by the death of Dr. R. M. Gage, vice-president of the convention, who died August 1st. He then referred to the fact that the convention had passed through its minority, and had outlived all the Judas attacks which had been made upon it. Treason had been discovered and checked. We had, however, overlooked and pardoned these attacks; we indeed sent duly accredited representatives to the body in which they originated. They had not been received. The child, in fact, demanded the death of its parent. We could not consent to that; while we were willing it should exist if it could find a soul to occupy its body, we could not believe that the work of this body was done. The old society was a procrustean bed; this was formed on a democratic basis. We are missionaries, and our work is not done; while they cull out the aristocratic sprouts we will dig around the old tree, make the bad good, and the good better. Some of the brightest ornaments in our ranks date their progress to this meeting. If there are no drones left among us our work is done; but that is not the fact.

Dr. Ambler then gave a detailed history of the convention, from its birth to the present time, naming the various places at which it had met and the presiding officers, and closed by expressing the hope that here in Long Branch the convention on attaining its majority might obtain a new lease of life.

Dr. Perrine rose to thank Dr. Ambler for the address, and for his efforts in behalf of the convention in the past. We knew what a fight he had fought and congratulate him on his success; he moved a vote of thanks, which was carried. The convention then listened to an address of welcome on behalf of the New Jersey State Dental Society, by Dr. C. S. Stockton, of Newark.

Dr. Stockton, after extending a hearty welcome on the part of New Jersey, said that degrees of latitude may make men hostile, but human suffering is universal; a fellow-feeling unites those severed on other topics, and cements a union. It shows man at his noblest. We are sometimes rent asunder by questions of state policy; but as the waters of the Atlantic and Pacific mingle, and the warm Gulf Stream flows through both, so in a common affection for our loved profession, in a zeal for her advancement, we may find something worthier of attention than the political issues of an hour; something that fuses our hearts into one love and enthusiasm. From the influence of these meetings men may be brought to understand each other better, and so knowing each other better, may become a noble-hearted fellowship. If we would have ourselves recognized as leaders and keep abreast of liberal professional men, we must not only devote ourselves heart and soul to every advance, but be familiar with the best current thought in other departments, and separate ourselves from every butchering empiric who may purloin our name at the cost of another man's agony. Then teeth shall vacate their sockets with the celerity of the 'coon of Western fable; then shall patients approach the dentist's chair, "not like the quarry slave, scourged to the dungeon," but as sweetly as "one who wraps the drapery of his couch about him, and lies down to pleasant dreams." If it be true that much gloomy theology arises from dyspeptic stomachs, and that these date back to defective teeth, we see how these last are important links in the sequence of human woe, and how they enter into the problem of misery in the world; how the profession of the dentist underlies that of the physician and the theologian. And if it be true that by sin the race has decreased its lease of life tenfold, by a return to more simple manners and by the agency of skilled men, of whom we are, mankind may regain its patriarchal longevity. May the next decade be as glorious for us as a profession as will be her centenary to our country! May it be long before our name is in the "sere and yellow leaf!" before any of our number fall "into the jaws of death!"

The president, Prof. Coy, then delivered his address. Dr. Coy said that the speakers before him had performed their parts so admirably, that nothing was left him but to thank the body for the position to which he had been chosen. He referred to the fact that the convention had attained its majority, and must now put on the armor of manhood and commence the struggle for maturity. None should look back or falter in this age of truth and progress. The world is rising to the discovery of nature's hidden mysteries. Science is possible only so far as we can unravel her laws; beyond is the supernatural. Our profession sympathizes with this movement. As regards dental education there has been an upheaval, and we are in a condition of chaos. There are honest men who are advocating that dental degrees be dropped, and that we shall only be known as medical graduates, and the specialty of dentistry classed with other specialties under the controlling title of M.D. Other men equally honest are fighting against this, and believe that it would undo all that has been done. Dental schools differ as to the proper *régime.* Some wish to extend the time of preparation; some favor a three years' course, others two, and still others think a diploma should be granted whenever merited, regardless of time. All are honest and true, and are working for the best. Some schools would be unwilling to have the degree conferred otherwise than by the faculty; others would delegate the power to a board of directors; others think that a preliminary education should be demanded. Time alone will elaborate this chaos and give us some fixed system. Each must unselfishly do all in his power to promote the general good, and out of it will come a creation that will satisfy us all. We should not be dogmatic nor be too certain of our own opinions, nor underrate those of others.

In the past year the State of Michigan has added a dental department to its university,—the first time that our specialty has been aided by State authority. All honor to Michigan! Let the good work go on. The United States Government has appointed a dentist to the Naval Academy at Annapolis, with the rank and pay of assistant surgeon. Thus the Government is waking up to the necessity of the times. The State of Maryland and District of Columbia have also formed a State organization during the year. Inventions in the operative and mechanical departments come up so rapidly that we exclaim, "What next?" Only by association and intercourse can we keep up at all, and the man who "fences himself in because he knows it all" is irretrievably lost.

The convention then adjourned.

Afternoon Session.

At the afternoon session a resolution was passed providing for the appointment of a committee to prepare appropriate resolutions in regard to the death of Dr. Gage. Drs. Perrine, Jarvis, and Winder, with the president, were appointed such committee.

Dr. Jarvis, in seconding the motion for their appointment, made some remarks highly eulogistic of the character of the deceased. He had known him long and intimately in every relation of life, and knew that he was a good man in every sense of the word. He had met him in places where a dentist even in sound health ought not to go,—among the poor, in the hospitals, and in the Tombs, breathing vitiated air which no doubt had hastened his death. Had he left this work to others he might have lived. But he could not. He sought not self, nor desired praise. When such a man departs, our thoughts and affections follow him.

Dr. Ambler followed in similar strain. He said we had lost more than we had any conception of. He corroborated all the statements made as to his good qualities.

The subject of "Dental Education," as presented in the address of the president, was then taken up.

Dr. Hunt, of Washington, said that it seemed to him that this movement looking towards making the profession simply a specialty of medicine is one in opposition to all sound views. When we look at the origin of the profession, we go back to very small beginnings. When men of talent first turned their attention to it, they were ignored by the medical profession. As years rolled on these men increased in numbers, and we have imperceptibly been able to take the stand we now occupy. States have recognized us by statutes. We have all at once broken upon the medical profession as a desirable body to be included in their ranks. It is now too late for that. We are not, and never have been, a specialty of medicine. Until recently we have never been recognized as such. Of late dental chairs have been attached to medical colleges. We have risen not through any aid, but alone, by the efforts of those who had the advancement of their calling at heart. Shall we now sacrifice all that has been done? The colleges are now almost as numerous as the members of this body. Shall we tear them down? shall we raze these monuments of devotion? shall we bury them in the specialty of another profession? What would be the effect upon the medical colleges? If our profession is a specialty of medicine, they should be at once prepared to take it up; but they are not; their whole plan would have to be changed, and their curriculum altered. It would really be introducing a new profession. He (the speaker) occupied the same ground on this subject as that taken by the *Pennsylvania Journal*. If the D.D.S. is a badge of a partial culture, as has been claimed, for what is it a partial preparation? For the practice of medicine? Yes; but that title does not signify a preparation for the practice of that profession. Suppose we acknowledge that it *is* a partial culture. Is the degree of M.D. a badge of full culture to practice dentistry? No. This argument will apply with more force to the medical profession than to us. The knowledge acquired in the dental college would enable its graduate to practice medicine a great deal better than the degree of M.D. would qualify a man for the practice of dentistry. It is the duty of every one to assist in advancing our profession to the highest position in which it can be placed.

Dr. John Allen thought the position of the two professions as at present was better than that proposed. The requirements for dental practice are so different from those for medical, that it is impossible to blend them. It is true the dentist must be a good physiologist and anatomist, but is that all? No; the acquirements of an M.D. are only a stepping-stone; there must be a great deal besides. We must be acquainted with the silversmith's business, with the moulding and casting of metals, with the properties of plaster; we must be good physiognomists; we must know the origin and insertion of every muscle of the face, and what difference the elevation or depression of a muscle will make in the expression. This is the art of the artist; its requirements are higher than those of the practitioner of medicine. Thirty or forty years ago very little was looked for. We do not need propping up by the medical profession. Let us stand upon our own foundation. He had known surgeons educated as such who, until they had become dentists, were never able to perform delicate operations and devise instruments as they were afterwards. There is no known business which requires more of the faculties of conception; ways and means must be invented. The head must devise and the fingers must execute. This is not required of an M.D.

Dr. Perrine. Those who can go back twenty-five years and see how we have crept along will open their eyes with amazement, but we are now on the first stepping-stone. The New York College was a step in advance; it is an independent school composed of young men. Among the young men are found those who can go ahead of the older ones. The profession is not at a stand-still; the next step will bring us up, up, up.

Dr. Jarvis. When we take this view of the matter, that we have only taken the first step to-day, we assume too much. All parts of truth harmonize, and all men seeking truth harmonize. Discussion lends zest. He does not think the gentlemen mean to say that dentistry is more important than medicine. It cannot be more important than the foundation on which it rests. If we say that, we shall excite opposition. Dentistry is superadded to medicine. What would an oculist do without a medical education? He tells young men that the one thing they need more than anything else is a thorough medical education. You of twenty-five years' practice have felt lame for the want of it. The speaker himself has, and what he has got has cost him more in books, time, and study than if he had got it in the regular way. He pities those who attempt to enter practice without it. Many come into the profession over the wall. He has spent time enough foolishly to have carried him through. Tell all the young men that they *must have* the education. Facts bear us out in saying that M.D. comes nearer covering dentistry than D.D.S. does medicine. To obtain a medical degree means another one hundred and fifty dollars, and a year or two more of time spent in preparation, and that means higher fees. We must have high fees. If any man earns his money it is he who earns it by scratching on human teeth and listening to the groans of his patient. That the younger men learn more and have a higher standard does not affect the older practitioners; it does not degrade *them*, it only raises the young men, and we will help them and glory in the progress they make.

Dr. Hunt. The medical profession should have co-operated with us, and they have done so. We will give them all the credit to which they are entitled, but the question is whether they shall swallow us up. The appointment of a dentist to the Naval Academy at Annapolis shows what position we are entitled to. It is a position which robs no one. The chief of the Medical Bureau in recommending the appointment of dentist to the Academy says that he considers it almost outside of the medical profession. If he takes that view, how should we look at it who know all about it? The dentist to the Academy at Annapolis was appointed to rank as assistant surgeon without examination, which is certainly a step in advance.

Dr. Perrine said that this appointment was due to the exertions of a New York dentist,—Dr. A. P. Merrill.

Adjourned.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

REPORTED BY HENRY C. LONGNECKER, LANCASTER, PA.

FIRST DAY—*Morning Session.*

THE Pennsylvania State Dental Society commenced its seventh annual session in the chapel at Cresson Springs, Pa., July 13th, 1875.

The meeting was called to order at 10 A.M. by the president, Prof. J. H. McQuillen, of Philadelphia.

The Pennsylvania College of Dental Surgery, Philadelphia Dental College, and the local societies in various parts of the State were fully represented by delegates.

Dr. R. Huey, Chairman of the Executive Committee, announced that the morning session would be held from 10 A.M. to 2 P.M., the evening session from 8 to 10 P.M. He further stated that clinics would be given in the reading-room of the hotel between the hours of 4 and 7 P.M. each day, until the adjournment of the society.

Dr. C. N. Peirce, Chairman of the Legislative Committee, reported that there had been several meetings of the committee, which resulted in the preparation of a bill which they believed would be favorably received by the Legislature. It was placed in the hands of a member of the House of Representatives, who promised to give it his personal attention; but after reaching a second reading it was allowed to be smothered by other business, and hence failed to be put upon its passage. But notwithstanding this unfavorable result, the committee are hopeful of its final passage by a future Assembly, provided members of this association and the profession in the State will exert their personal influence with the representatives from their individual districts.

The bill as presented to the Legislature was read.

On motion, the report was accepted and the committee continued.

The following is the act reported by the committee:

An Act to Regulate the Practice of Dentistry and to Protect the People against Empiricism in relation thereto in the State of Pennsylvania.

SEC. 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by authority of the same*, That from and after the passage of this act it shall be unlawful for any person to engage in the practice of dentistry in the State of Pennsylvania, unless said person has graduated and received a diploma from the faculty of an institution where this specialty is taught, chartered under the authority of some one of the United States or foreign governments, or shall have obtained a certificate from a Board of Examiners, duly appointed and authorized by this act to issue such certificates.

SEC. 2. That the Board of Examiners shall consist of six practitioners of dentistry, who are members in good standing of the Pennsylvania State Dental Society. Said Board shall be elected by the Pennsylvania State Dental Society at their next annual meeting as follows: two shall be elected for one year, two for two years, and each year thereafter two shall be elected to serve for three years, or until their successors are elected. The Board shall have power to fill all vacancies for unexpired terms.

SEC. 3. That it shall be the duty of this Board—First, to meet annually at the time and place of meeting of the Pennsylvania State Dental Society, and at such time and place to conduct the examination of applicants. They shall also meet for the same purpose at the call of any four members of said Board, at such time and place as may be designated. Thirty days' notice must be given of the annual meetings by advertising in at least three periodicals, one of them being a dental journal, and all published within the State. Second, to grant a certificate to all applicants who undergo a satisfactory examination, and who receive not less than four affirmative votes. Third, to keep a book in which shall be registered the names and qualifications, as far as practicable, of all persons having certificates to practice dentistry in the State of Pennsylvania after the passage of this act.

Sec. 4. That the book so kept shall be a book of record; and a transcript from it, certified to by the officer who has it in keeping, with the common seal, shall be evidence in any court in the State.

Sec. 5. That four members of this Board shall constitute a quorum for the transaction of business; and should a quorum not be present on the day appointed for their meeting, those present may adjourn from day to day until a quorum is present.

Sec. 6. That any person who shall in violation of this act practice dentistry in the State of Pennsylvania, shall be liable to indictment, and on conviction shall be fined not less than one hundred or more than three hundred dollars.

Sec. 7. That one half of all fines collected shall inure to the informer, and the other half to the educational fund of the county in which the prosecution occurs.

Sec. 8. That nothing in this act shall apply to persons who shall have been engaged in the practice of dentistry in this State for five years or over at the time of the passage of this act.

Sec. 9. That to provide a fund to carry out the provisions of the third section of this act, it shall be the duty of the Board of Examiners to collect from all who receive the certificate to practice dentistry the sum of thirty dollars each; of which sum, if there be any remaining after liquidating necessary expenses, the balance shall be paid into the treasury of the said Pennsylvania State Dental Society, to be kept as a fund for the more perfect carrying out of the provisions of this act, and the Board of Examiners for their remuneration shall receive from the above fund ten dollars per day for each day of actual service.

Sec. 10. This act shall take effect immediately.

At twelve o'clock the miscellaneous matter had been thoroughly and promptly disposed of, and the society was ready to take up the regular order of business.

The vice-president, Dr. E. T. Darby, having been called to the chair by the president, the latter read an essay on "Influence of Variations in Temperature and Moisture on the Teeth."* The paper was well received, and an interesting discussion followed.

Dr. Peirce thought the phenomena referred to in the paper were confined to inanimate objects,—that, in case of the teeth, he believed the variations in temperature to which they were subjected produced an injurious effect upon the vitality of the pulp rather than upon enamel and dentine.

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* See Dental Cosmos, September, 1875, p. 475.

Dr. Stellwagen has made repeated experiments before the classes of the Philadelphia Dental College to test the influence of thermal changes,—places teeth in snow, and when they have reached the temperature of the surrounding medium, throws them in boiling water,—never noticed any change from such experiments,—thinks that thermal changes have an injurious effect upon the whole tissue. Stated, upon what he regarded as good authority (Drs. Redman, Visick, and Williamson), that there was little difference between the teeth of corresponding classes in this country and Great Britain; did not think the hygrometric state of the air affected caries; differed from the essayist as to dryness promoting or causing caries, and in support of his position cited the case of the inhabitants of Egypt.

Dr. Klump announced the death of Dr. J. M. Barrett, of Wilkesbarre.

Dr. Stellwagen moved that a committee of three, with Dr. Klump as chairman, be appointed to draft resolutions expressive of the sense of the meeting. The committee consisted of Drs. Klump, Huey, and Darby.

An essay on "The Lower Forms of Life found within the Oral Cavity"* was read by Dr. C. N. Peirce.

On motion of Dr. Webb a vote of thanks was tendered Dr. Peirce for his able essay, and the discussion upon it was reserved for the evening session.

Also a vote of thanks to Dr. R. H. Moffit for furnishing the drawings by which the essay was illustrated. The motion was carried unanimously.

Adjourned to 8 o'clock P.M.

Afternoon—Clinic.

The association convened in the large reading-room of the hotel for clinics.

Dr. M H. Webb, of Lancaster, exhibited the working of a new electro-magnetic mallet, made by himself, by filling a large cavity in a central incisor. The operation and the instrument were both subjects of great admiration by the members. This instrument is an improvement upon the Bonwill mallet, and for delicacy of adjustment, compactness of form, and thorough adaptability of parts is certainly a fine piece of mechanism.

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* See DENTAL COSMOS, September, 1875, p. 449.

Dr. Guilford, of Philadelphia, also gave a clinic upon a lateral incisor, separating it from the tooth adjoining by means of quick wedging. The preparation and filling of the cavity were done from the palatine surface with remarkable ease and facility; the operation, when finished, though large, exposed no gold to view, thus showing a skill that justly elicited the highest admiration of the members. The gold was impacted by the aid of Dr. Bonwill's improved electro-magnetic mallet, and notwithstanding the cavity was very inaccessible, the condensing was admirably done.

Evening Session.

The society convened pursuant to adjournment, and was called to order at 8 P.M. by the president.

Discussion of Dr. Peirce's paper being in order, Dr. Truman remarked that he differed with the writer on some minor points; prominent among them was the idea that leptothrix had anything to do with the formation of tartar. It was true they were always present, but that they could be the cause, or even exert a very great influence, was to him a matter of extreme doubt. In his observation leptothrix were propagated in the largest quantities in localities where acid reaction was most perceptible. If this was true, it could only exist in tartar as a secondary result. His idea of the effect of leptothrix in caries was, that being held as a mat against the walls of the cavity, it held the acid secretions in close contact and thus caused the destruction witnessed. He thought it might be a cause for increased formations of acid, and thus act,—continuing as long as moisture was present.

Dr. Peirce stated he was misunderstood in supposing that leptothrix caused the formation of tartar: it simply develops the animalculæ by decomposing the food. In his observation he discovered that the soft, cheese-like substance which accumulates upon artificial dentures abounds with leptothrix, the same as upon the natural teeth. Where there is marked evidence of an acid reaction this form of parasite will be found to be very numerous.

Dr. Stellwagen had given this subject some attention, but regarded these lower forms of life as the result of natural conditions, consequently the accompaniment rather than the cause of caries. The spores and germs of these living things abound in the air we breathe, and live upon most of the food we eat, while water is often an elysium wherein the very height of their happiness and fertility is acquired. The oral cavity presents by its warmth and moisture favorable conditions for the fructification and increase of this life, and the constant supply of fresh stock from the outside world by immigration through these means tends to renew and replace whatever may be lost by the acts of mastication, deglutition, and cleansing. Upon the more exposed smooth surfaces of the teeth, however, the aforementioned acts seem to gain the advantage, and, therefore, in only exceptional cases can we find the animalculæ of the mouth. Life generally selects the valleys, the jungles, the crevices, and soil in preference to the mountain-side or hard rock, so here we find the interstices, the fissures, and roughened carious surfaces of the teeth are the favorite haunts of these creatures, here the flora and fauna of this wonderful cavity rest comparatively secure from the hurricanes of breath, deluges of drink, and cataclysms of mastication.

About a year ago a gentleman called to have his mouth examined; it was scrupulously clean, yet he informed me that it was rich in animalculæ. He had but one small carious spot in a tooth. I suggested to experiment by delaying operation of filling the cavity, in order to determine if in consequence of the presence of such quantities of parasites there would be a corresponding increase in the cavity. For three months he made occasional examinations with the microscope, finding the growths invariably present, in which he was confirmed by Mr. Holman, Actuary of the Franklin Institute, a well-known and able microscopist; there was no alteration in the tooth; again three months more, with like result, and finally a few days ago I made a searching examination of the cavity and found no appreciable change. This seemed to be a fair argument that in this case the mere presence of these low forms of life was not of itself sufficient to accelerate caries of the teeth.

Vice-President Darby having been requested to take the chair, Dr. McQuillen read a paper on "Oral Organisms."*

SECOND DAY—*Morning Session.*

The meeting was called to order by the president at 10 A.M.

The committee in reference to the death of Dr. Barrett reported a series of appropriate resolutions, which were unanimously adopted.

Next in order, an essay was read by Dr. E. T. Darby upon the "Electro-Magnetic Mallet," in which he gave the history from its earliest conception up to the present time, and accorded to Dr. Bonwill the credit of having originated and perfected the instrument as we now find it. He looked upon it as an indispensable instrument, saving to patient and operator time, pain, and labor.

Drs. Huey and Guilford, who have used the electro-magnetic mallet for several years, fully indorsed the views advanced by the essayist.

Dr. Truman had been one of the first to use the electro-magnetic mallet, and had found it a valuable and indispensable instrument. He claimed that the professional man had as much right to take out a patent as a copyright, and that it was an act of injustice to deny him his right to do so. The patentee, indeed, was more entitled to his claim as a rule than the author. The first really invented, while the last too often only copied the thoughts of others and palmed them off as his own.

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* This paper will appear in a future number of the DENTAL COSMOS.

Dr. C. S. Beck, of Wilkesbarre, said that his experience with the instrument had been exceedingly unsatisfactory up to the present, having spent a considerable sum of money and time without any corresponding advantage to him. He had two instruments in his possession, and was not able to use either of them; but, modified and perfected as it now is, he thinks it will do all that is claimed for it.

Dr. Stellwagen had used the mallet with great benefit and satisfaction; must say that it is a valuable improvement, and he presumed that as the case is before the United States courts for the awarding of the patent, we would probably learn from competent and disinterested persons who was truly the inventor, and from interested persons how much we are indebted to them in dollars and cents, when ample opportunity would be afforded to liquidate the same in currency.

He objects to patents upon materials, compounds, implements, or machines for alleviating human suffering at the hands of the physician, as calculated to interfere with the prompt and efficient cure of maladies of mankind, and to reduce the noble and generous profession to the level of a handcraft, that only flourished upon the miseries of its patients. Inventors could be more richly repaid in the consciousness of adding to the ability of a great profession to aid, relieve, and succor the afflicted poor and needy than any possible amount of mere lucre could benefit the patentee by filling his purse with paper and his heart with avarice.

Patent-rights differ widely from copyrights; they lock up the use of the idea with the machine and prevent advancement, except with the consent of the holder of the patent, who, if it be worth anything, is generally a merchant, who for a mess of pottage has bought the birthright and soul of the invention from its starving originator, who, driven to the verge of madness by legal formulæ, has parted with it for a mouthful of ready food.

Copyright secures no exclusive use of the thought or its adaptation to other purposes; no one can fairly compare the effects of the two as similar upon the improvement of mankind. This sophistry, of these rights being alike, has gained weight in our day, yet it needs only to be logically dissected to be dispelled.

He had been using Dr. Jack's mallet, as it was free from all patents upon improvements, and decidedly the better instrument of the two he had any practical experience with. Dr. Webb yesterday exhibited to him a new form of mallet, made by himself, which he much admired; thought it would be almost "*ne plus ultra*" as an electric mallet.

The doctor asked if the undecided claims for patent-right already sold would not enable the holder to control the manufacture and sale of any improvements, even if made by the original inventor himself; and, therefore, what (save the subsidiary improvements) could any one give to the profession?

Dr. Peirce was interested in the mallet, but had not had a very extended experience in the use of the instrument. He bought one of the original mallets, but was unable to use it to his satisfaction. He was opposed to professional men taking out patents on instruments, etc., to be used in practice.

Dr. Kremer, of Lebanon, gave an enthusiastic indorsement of the instrument, based upon several years' experience in its use.

Dr. Difenderfer, operated upon at the clinic yesterday afternoon, gave testimony as to the electro-magnetic mallet being a pleasant instrument to the patient.

Dr. McQuillen had at first been disappointed in his expectations with regard to the electro-magnetic mallet; but during the past six months had been using Dr. Bonwill's improved instrument with decided satisfaction. Regarded the instrument as a valuable improvement over all other mallets for the impacting of gold. He objected to the taking out of patents on the part of professional men. This was a question, however, in which there might be honest differences of opinion.

Dr. Bonwill spoke in behalf of the instrument and of the time it had cost him to bring it to its present degree of perfection, and claimed that not only his rights as a citizen but as a professional man entitle him to take out a patent for it; this, however, has not been done.

Dr. Webb. In operations of a high order the gold should be of uniform density and solidity throughout its whole mass. With no other instrument can these be attained to such a degree of perfection with the same expenditure of vital force as with the electro-magnetic mallet. He agrees with the essayist that it saves time, labor, and pain, and paid a glowing tribute to the genius of the inventor and the efficiency of the instrument.

An essay upon "Dental Caries"* was next read by Prof. T. C. Stellwagen.

Dr. Beck believes that constitutional causes play an important part in the development of dental caries. Endeavors to have control of his patients, so that he may prescribe such treatment as he thinks necessary.

Dr. Peirce said the paper just read by Dr. Stellwagen embraced a subject of paramount importance to the dentist, and considering the years dental caries and its causes had been under discussion, we know comparatively little about it. The various theories that had been advanced respecting it were simply a recognition of attending conditions, and did not solve the problem as to the primary cause. When we assert this to be chemico-vital, it is merely the announcement of a fact, without any explanation of the pathological conditions or the primary cause producing these abnormal results.

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* See page 505, current number DENTAL COSMOS.

Not unfrequently patients are met with whose teeth have such a predisposition to decay that for months all efforts for their preservation seem futile, and not until there has been a marked change in the system are professional labors rewarded with success. The dentist needs constantly to exert with such patrons some force for their physical improvement, supplying, if possible, material that will overcome the waste and counteract the destructive agent. With these conditions and requirements so patent, it looks much as if the vital theory, as it is termed, should receive more attention rather than less.

The claim for leptothrix as a primary cause of caries is not sustained by the facts; this growth is not confined to decaying teeth, but is found wherever there is lodgment for decomposing animal or vegetable tissue, whether that be on the mucous membrane, accumulations of tartar, necks of teeth, or cavities of decay; and the influence it would exert, if any, would be largely secondary.

Dr. Darby. In his experience failures occurred when there was a predisposition to decay; thinks the teeth are degenerating; sees decay in places he did not before, and notwithstanding his best efforts he meets at times with failures; thinks therapeutic agents may be beneficial in arresting decay; regrets that some therapeutic agent cannot be prescribed to prevent caries.

Dr. McDonneld regarded the chemico-vital theory as correct; thought we would have no caries if the tooth-structure was perfect, but to insure a perfect tooth-structure would necessitate the regeneration of the whole human race, which, although desirable, was rather impracticable. His operations upon the grinding surfaces were, with few exceptions, successful, while those upon the proximate surfaces often required refilling.

Dr. Klump, of Williamsport, alluded to the physical deterioration attendant upon the want of proper exercise and fresh air, and believed that it extended to the teeth along with other organs of the body.

Dr. Truman regarded the malarial influences of certain sections of our country as exercising a baneful effect upon the teeth.

Dr. Heiges, of York, directed attention to the importance of cleanliness as a preventive of decay.

Dr. Isenberg attributes caries, in many cases, to improper diet.

Dr. King, of Pittsburg, believed that the violation of hygienic laws, and particularly those relating to teeth, was the most prolific cause of decay, and that the true remedy was to be found in getting back to the order of nature. He would call upon the president for his views upon that point.

Dr. McQuillen in response said he had more faith in the use of proper food in correcting the defective nutrition of the teeth than in the employment of medicinal agents. The unfortunate experiences of men on long voyages, and experiments on animals, have shown conclusively that when confined to a single article of diet, or food poor in quality, defective nutrition, disease, and death sooner or later ensue. The complex organism of man demands a mixed diet, and that each organ and tissue shall have the elements supplied to it that are required to repair the waste that is constantly going on. This is true of the teeth as of other organs.

Adjourned.

Afternoon—Clinic.

The society convened in the reading-room of the hotel for the purpose of witnessing the clinics.

Dr. E. T. Darby, of Philadelphia, gave a clinic upon a right inferior molar, impacting the gold by the aid of Dr. Bonwill's new electro-magnetic mallet. It was pronounced by those present a fine operation. A reverend gentleman who was looking on highly complimented the operator on the skill and dexterity with which he used his instruments.

Dr. McDonneld, of Conneautville, restored the crown of a left superior bicuspid. This was a protracted operation, and performed with skill and ability. He used Buckingham's automatic plugger, attached to the S. S. White engine.

Evening Session.

The meeting was called to order by the president at 8 P.M. On motion of Dr. Huey, the regular order of business was suspended for the purpose of selecting a place for holding the next annual meeting of the society and the appointment of an executive committee. Philadelphia was named, and on motion of Dr. Huey was chosen as the next place of meeting.

The present Executive Committee was continued, with power to fill vacancies. The committee is composed of the following members: Drs. R. Huey, R. H. Moffitt, J. Truman, C. N. Peirce, and S. H. Guilford.

Prof. Truman, on behalf of the faculty of Pennsylvania College, tendered the use of the college building to the society during the sessions to be held in Philadelphia, July, 1876. Prof. McQuillen tendered the building of the Philadelphia Dental College for the same purpose. Referred to the Executive Committee.

An essay was then read on "Dental Therapeutics," from Dr. John Murray, of Rochester, Pa., in which the remedial agents employed in the practice of dentistry and their action upon the teeth were duly considered.

Dr. Truman. The essayist, instead of confining himself to Dental Therapeutics, has endeavored to cover the entire ground of the Materia Medica; thought he should have given the therapeutic agent employed in specific cases, and followed out the treatment in detail. In cases of periostitis, the usual treatment is blood-letting, etc., then let the patient go. Such practice should be condemned; something more is required, some agent that will act directly upon the part affected. The essayist failed to mention any such therapeutic agent; rhigolene spray is an admirable remedy, and almost certain in its result. Its dangerous properties may be overcome by avoiding proximity to flame. It should be used only in daylight.

Next in order was an essay on "Dental Education," by Dr. Samuel Welchens, of Lancaster, in which the curriculum of instruction in the dental colleges was claimed by the essayist to be well calculated to fit the student to enter upon practice with advantage to his patients and credit to the profession. He alluded to the great advance that had been made by the profession within the past quarter of a century, and attributed it largely to the influence exerted by the colleges.

Dr. Peirce said: In discussing this question of dental education, he would not presume to be more in favor of a thorough and liberal education than others, but the question was as to the best method of obtaining it. While he recognized the fact that dental colleges had greatly enlarged their facilities, and that they had offered in the past the best opportunity attainable to the dental student, still, the query constantly presenting is, Do they offer all of the advantages essential to a practitioner of dentistry? If they do not, then how can the deficiency be supplied? The field of labor for one in this specialty is gradually and steadily widening, hence the requirements being greater, the attainments must be proportionately increased. That this demand can all be supplied within the limits of a dental school is probable, but in order to do it, an ever-increasing watchfulness and untiring exertion towards improvement on the part of those to whom is intrusted the teaching will be most essential. Almost daily our offices are visited by those suffering from abnormal conditions involving the soft tissues and parts surrounding the oral cavity, and these conditions are not unfrequently either influencing or influenced by the general health, so that familiarity with systemic disorders and therapeutic agents, correcting or modifying the same, is an increasing requirement. To meet these and command the confidence of his patrons the dental practitioner needs to have opportunities greater than those afforded him in the past.

An animated discussion followed, which was participated in by all the members. The general opinion expressed was that the colleges had done, and were doing, a valuable work in the cause of education, and that the efforts of the faculties should be aided by liberal endowments on the part of the profession, particularly from those who do nothing but point out defects.

Adjourned to 9 A.M., Thursday.

THIRD DAY—*Morning Session.*

The meeting was called to order by the president. The minutes of the previous day were read and approved.

Next in order an essay was read by Dr. G. W. Klump, of Williamsport, on "Hygienic Laws," in which he directed attention to the confinement of the busy practitioner to his office in the daily round of professional duty, and the deprivation of a due supply of fresh air, sunshine, and exercise, as calculated to injure the health, impair the usefulness, and shorten the life of the practitioner.

Dr Peirce spoke of the importance of proper ventilation of offices, both for patients and operator, and the necessity of the latter forcing himself to go out into the open air when through with his daily round of professional duties, however much inclined he might be to lie down and rest himself.

Dr. Darby advocated low-down grates as the best means of warming and ventilating dental offices. He had introduced them in his office at some expense, notwithstanding the fact that the house was warmed with a heater.

Dr. Jesse C. Green, of West Chester, directed attention to the necessity of having openings near the floor as well as near the ceiling, so as to secure a current of air by which the room could be ventilated. He had had considerable experience in this matter in the construction of school-houses, as a member of the board of directors.

Dr. Beck gave a personal experience of the advantage he had derived from working two or three hours every day in his garden at a time when he had been prostrated by too close application to his office. His health, strength, and weight improved under this, and he had continued the practice ever since, planting and cultivating all of the vegetables placed upon his table.

Dr. McDonneld gave a somewhat similar experience of the benefit derived from working in a garden.

Dr. Guilford. Every means should be used that is practicable to overcome the injurious effects of the confinement and constrained position the dentist is compelled to assume in the performance of his operations.

Dr. Stellwagen regards a country residence, to which the city practitioner would be compelled to ride several miles every day, as an excellent means of maintaining health of body and mind. He also believed, and carried out his conviction in that direction, in reserving half a day in the week, in addition to Sunday, for out-door life, and spoke enthusiastically of the pleasures and benefit to be derived from horseback exercise, particularly in following the hounds in a fox-hunt.

Dr. McQuillen. The best way to ventilate a room is by lowering the upper sash of the window and raising the lower one. Bedrooms in particular should be supplied with fresh air in this manner, so that those using them may rise in the morning refreshed by sleep, rather than enervated and weakened by confined and necessarily impure air. Much had been said about the importance of exercise, and much might be said of the necessity of rest for the overtaxed practitioner. Recognizing this, he was, at the same time, an earnest advocate of exercise. The gymnasium, fencing, rowing, swimming, etc., had been indulged in regularly and systematically by him for a long period of years, and he believed that it would have been impossible for him to have got through with the work that had fallen to his lot in the varied fields in which he had labored but for exercise thus obtained. Daily ablution was dwelt upon as an important means of maintaining health.

The discussion was followed by the reading of an essay on "Operative Dentistry," by Dr. M. H. Webb, of Lancaster, Pennsylvania.

Dr. Peirce said the subject treated in the paper just read by Dr. Webb is one of great interest, and the essayist deserves much credit for the thorough manner in which he has handled it. Certainly, any one following the manipulations as therein indicated would do in the large majority of cases complete and efficient work. But there are exceptions to every rule, and while contour fillings are beautiful in all cases, and successful in many, yet there are conditions in which it would be time and labor worse than wasted to attempt them, a free space between the teeth being so strongly indicated. Again, there are teeth upon which an effort to place the rubber dam causes so much annoyance and suffering to the patient that prudence demands its abandonment, nor are the teeth to go unfilled and be sacrificed for the want of it. When we cannot do as we desire, we must submit to conditions which cannot be overcome, and do the best they will permit. Many teeth have been saved for years by fillings put in not only without napkin or rubber dam for their protection, but with every piece of gold saturated thoroughly with moisture as it passed into the cavity; and not only that, but the cavity itself not dry during any stage of the operation, yet such fillings last and preserve the teeth. Heavy gold, from No. 30 to 60, can be so thoroughly consolidated under water with suitable instruments that it may be afterwards rolled into plate.

Dr. Klump took exception to the statement made by the essayist, that the teeth were deteriorating. He thought the teeth as good now as they were years ago. From his observation and experience he could not see there was any degeneration in the teeth.

Dr. Stellwagen. In the present state of our profession it is impossible to save every tooth, and after the loss of a crown, and its replacement with a substitute, the root may fail as an attachment. This, however, leaves us yet one more resort,—the transplantation of natural teeth from the mouths of other patients or from the lower animals. Recently he had two successful cases of the former, and felt almost certain that there might be artificial substitutes for teeth made of ivory or some other material that could be held in position without clasps or plates.

Dr. Huey desired to know at what point it would be best to open into the pulp-chamber.

Dr. Stellwagen, in reply, stated, in case of the anterior teeth, on the palatine surface, and in case of other teeth, at a point least seen.

Dr. Truman does not think operative dentistry consists entirely of the filling of teeth; thinks the essayist confined himself too closely to the details of tooth-filling; differed from the paper, wherein it was advocated to cut through the grinding surface to reach a cavity in the proximate surface. He opposed the contour of the parts as unphilosophical, and advocated wide separations; thinks the value of the rubber dam is over-estimated, and that it is not necessary to use it in all cases; the ligatures produce irritation, which it is often difficult to overcome; had seen injurious results from the indiscriminate use of the rubber dam analogous to that from quick wedging; regarded the transplanting of teeth as very dangerous, and in the practice of it advised the utmost caution, thereby lessening the probability of tetanus, which in some cases was likely to ensue.

Dr. McDonneld advocated double and single V-shaped separations as preferable to restoring the contour of the parts; was inclined to be conservative in his practice, but under all circumstances advised the use of the rubber dam; believed in sacrificing tooth-structure to bring to view the cavity, and stated he has had many failures, due to the fact that the operation was performed without gaining sufficient room.

Dr. Webb. Prof. Truman has told us what he considers is not operative dentistry, but has failed to inform us in what it does consist. The term operative dentistry is derived from the Latin *dens*, a tooth, and *opus*, a work; hence primarily it signifies working or operating upon the teeth. Almost all the operations practitioners are called upon to perform consist in substituting or inserting a material for lost tissue; thus, both in theory and practice, operative dentistry is principally confined to the treatment and filling of teeth. The removal of tumors and ulcers, operations for cleft palate and those of a like nature, though often considered within the province of operative dentistry, more properly come within the scope of oral surgery.

Dr. Guilford was surprised to hear Prof. Truman condemn the use of the rubber dam as not only in many cases unnecessary, but often dangerous. In his experience he had never seen any bad result or even trifling inconvenience from its use; he regarded it as the most valuable of all dental appliances, and considered it impossible to perform first-class operations without it. He advocated quick wedging, and thought irritation kept up five minutes was not so injurious as when continued for days.

Under the head of new business, Dr. Stellwagen offered the following amendment to Article III. of the Constitution, by adding:

Section VII. That no one but a regularly received delegate or permanent member shall be invited to take a seat or part in the discussions of this society, except for the purpose of prayer or by unanimous consent; but that a gallery or seats may be set apart by the Executive Committee to accommodate visitors whom the society may be pleased to see present.

Dr. Huey presented the following resolution, which, on motion, was adopted:

Resolved, That whenever at a meeting of a local society represented in this association a paper shall have been read which in the opinion of two-thirds of the members present is worthy of publication, it may be referred to the Executive Committee of this association for acceptance or rejection; if accepted, to be read and published with the Trans actions.

The election of officers for the ensuing year resulted as follows:

President.—Dr. E. T. Darby, Philadelphia.

First Vice-President.—Dr. J. C. Green, West Chester.

Second Vice-President.—Dr. C. S. Beck, Wilkesbarre.

Recording Secretary.—Dr. R. H. Moffitt, Harrisburg.

Assistant Secretary.—Dr. S. H. Guilford, Philadelphia.

Corresponding Secretary.—Dr. M. H. Webb, Lancaster.

Treasurer.—Dr. S. Welchens, Lancaster.

Board of Censors.—Drs. T. C. Stellwagen, G. W. Klump, C. N. Peirce, M. H. Webb, J. G. Templeton, J. C. Green.

A publication committee was appointed, as follows: Drs S. Welchens, J. H. McQuillen, R. H. Moffitt, C. N. Peirce, M. H. Webb, G. W. Klump, J. G. Templeton.

The president appointed Drs. C. N. Peirce and James Truman a committee to conduct Dr. E. T. Darby, the president elect, to the chair; who, in entering upon his official duties, thanked the members for the honor they had conferred upon him by the election.

Dr. McQuillen, in retiring from the chair, congratulated the association upon the amount of work that had been accomplished during the short period they had been together. The essayists appointed at the previous meeting had come up to the mark without a single exception. He would not dwell upon the character of the essays, as they spoke for themselves. The discussion following the reading of these, earnest, and, at times, somewhat spirited, had been both instructive and harmonious. The entire session had been most profitable and agreeable to those present. According to the programme arranged by the Executive Committee, it was now his duty to make the *President's Retiring Address.*

Departing from the usual custom under such circumstances, of discoursing upon the "past, present, and future position of the profession," he would invite their attention for a brief period only to the description of "a case of oral surgery" that he had under treatment some years since.* The paper was illustrated by photographs of the patient, taken prior to and after the operations.

The new president appointed the following gentlemen as delegates to the associations:

American Dental Association.—Drs. J. H. McQuillen, C. N. Peirce, T. C. Stellwagen, S. H. Guilford, M. H. Webb, G. W. Klump, J. C. Green, and G. B. McDonneld.

New York State Dental Association.—Dr. S. Welchens.

Wisconsin State Dental Society.—Dr. M. H. Webb.

Southern Dental Association.—Dr. S. Welchens.

On motion, the society adjourned to meet in Philadelphia the second Tuesday of July, 1876.

MISSOURI VALLEY DENTAL SOCIETY.

The annual meeting of the Missouri Valley Dental Society was held on Wednesday, July 28th, 1875.

President Dr. C. Thomas in the chair.

The election of officers for the ensuing year resulted as follows:

President.—Dr. J. W. Chadduck.

Vice-President.—W. F. Roseman.

Secretary and Treasurer.—F. M. Shriver.

Executive Committee.—Drs. C. Thomas, J. F. Sanborn, J. W. Chadduck.

Committee on Membership.—Drs. J. F. Sanborn, F. M. Shriver, E. J. Woodbury.

Adjourned to meet at Omaha, Nebraska, on the fourth Tuesday in July, 1876.

F. M. Shriver, *Recording Secretary.*

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* See Dental Cosmos, August, 1875, p. 397.

MICHIGAN DENTAL ASSOCIATION.

This association will hold its annual meeting at Cook's Hotel, Ann Arbor, commencing October 12th, 1875, at twelve o'clock, M., and continue three days. The newly established dental college being located at Ann Arbor, it has been deemed advisable by a large number of the profession to change the place of meeting from Grand Rapids to that city. It is hoped that all members of the profession will be present, as subjects of great interest will be brought up for consideration. All are cordially invited.

W. D. Tremper, *Secretary.*

OBITUARY.

DR. AARON BLAKE.

At a special meeting of the St. Louis Dental Society held August 24th, 1875, resolutions of respect to the memory of Dr. Aaron Blake, who died at his residence in St. Louis, August 23d, aged sixty-five years, were unanimously passed.

PERISCOPE.

Dental Surgery and Mechanical Dentistry.—Sir,—In the paragraph referring to Mr. Hamilton Cartwright's letter in your issue of last week, you ask whether it would not be well if the surgeon-dentist were to confine himself to the surgical care of the diseases of the teeth, and to intrust to other hands—those of the mechanic—the business part of dentistry, the manufacture of teeth. The question of the separation of the two apparently distinct branches of dentistry has been carefully considered in past years by the leading members of the profession, and the unanimous opinion has been formed that it is impossible for the mere artisan, however skillful, to practice successfuly even what —as you say—seem at first sight simple mechanical operations, the construction of artificial teeth and their adaptation to the mouth. To practice this art safely, a professional education is required, such as is undergone by candidates for the license in dental surgery of the College of Surgeons. This course of study, besides practical instruction in dental surgery and mechanics, provides that the candidate shall go through a course of instruction in general anatomy and surgery, so that, having an acquaintance with the nature of disease and the principles of medical practice, he may avoid error, and be able to deal with confidence with the special region of the body to which his treatment will be confined. Not to speak of the mechanical treatment of cleft palate, of deformities of the jaws, of irregularities of the teeth, I may safely affirm that every dental surgeon meets almost daily with cases which could have presented originally no difficulty, but which, having been treated by uneducated mechanics, without regard to the physiology of the teeth and of the parts influenced by the apparatus, have resulted in the infliction of unnecessary, intense, and prolonged suffering.

In mechanical dentistry, as in every other department of surgery, we have in every case to deal more or less with living structures; and ignorance on the part of the practitioner, being very closely allied to cruelty, cannot under any circumstances be tolerated. It is customary to estimate lightly the suffering which arises from dental disease and from the ignorance of the dental mechanic,—perhaps because it does not directly endanger life; but I may venture to assert that there are well-nigh as many lives rendered wretched from this cause as there are from any other kind of physical pain which afflicts mankind.

Your obedient servant,

6 Wimpole Street, July 17th. HENRY SEWILL.

⁂ Mr. Sewill appears to us completely to misunderstand the argument, and to confuse things which it is the gist of the matter to discuss separately. The treatment of cleft palate, deformities, etc., is a branch of dental or, as it is more properly called, oral surgery. The making of instruments for the purpose, and the making of sets of teeth, is mechanical work. All that Mr. Sewill says of the necessity of surgical knowledge in devising, modifying, and directing the application and fitting of them, is equally true of trusses, orthopedic instruments, and other contrivances. Surgeons do not, however, on that account make the instruments themselves; and we are still of opinion that Mr. Sewill entirely fails to show that the dental surgeon would not have a higher average skill, capacity, and status if he separated his profession from the *métier* of the mechanical dentist.—*British Medical Journal.*

MEDICAL EDUCATION IN AMERICA.—The annual announcements of many of our medical schools, which appear usually at this time of the year, give one in some degree a means of measuring the standard of medical education in this country. We say in some measure, for the style of most of these productions is so glowing that to arrive at a just estimate of the educational advantages of the various schools requires a pretty careful study of these yearly announcements, and considerable experience of the methods employed to attract students. There is a certain theatrical coloring about these circulars, which is well calculated to mislead the unwary. We find, for instance, in one the statement that "the success of this department is without precedent;" another affirms the success of its alma mater to be "unparalleled," while a third indulges in congratulations to "the alumni and the friends of the college upon the flourishing state of its affairs." Turning down the foot-lights and letting in a little of the matter-of-fact light of day, let us endeavor to determine how much cause for congratulation we really have.

Undoubtedly there has been considerable improvement. The old-fashioned course of two sessions during the winter season, of scarcely more than four full months each, interlarded with mercantile, agricultural, and other pursuits, and preceded by a "full year's study with a respectable practitioner" (on paper), is pretty generally conceded to be a programme which will not "draw" nowadays. It has been found necessary to promise more than this, and various expedients have been resorted to. The winter course has been lengthened by giving a "preliminary course,"—of two weeks' duration,—which, it is claimed, "enables professors to consider exhaustively subjects of importance which cannot be so fully treated during the regular session;" or, instead of this, the course is inaugurated by a series of popular lectures. A more important addition is the so-called summer session which most schools have adopted, although we find in one case, after a great flourish of trumpets, that the course is to be of but six weeks' duration! The general plan of study during this term is supplementary to that of the winter term, and the instruction given is often the best of its kind; but it possesses a great disadvantage in not being part of the required course, and is consequently attended by a very small proportion of the students; moreover, it is not to be compared with a system which provides two full terms of carefully-arranged work to all students during the year.

This is about as far as most of our faculties have dared to go, notwithstanding the success attending the experiment made by one school of giving three full years of college instruction. The only attempt in this direction which has thus far been made is a graded course of three years offered to those students who desire to undertake it. We sincerely hope that there are enough sensible young men to see the advantage of this plan of study to make the adoption of it as the required course necessary. Until this has been done no school will have a right to say that it gives more than two years of instruction. In reality, the majority of American students graduate after eighteen months of college-work, preceded by a year of such study as the acquirements or time of the private instructor permits. What a fraud this first year's course of study really is most of our college deans could undoubtedly tell us, were it desirable to do so, and yet we hear much talk about a full three years' course. Until a radical change has been adopted in the method of instruction it would be hardly worth while to bring up the question of a preliminary examination. This we are glad to see has been adopted by that school which has made the needed reforms, and by one other also.

We regret to be unable to give a better report of the progress made by our teachers in the cause of medical education. The old policy of endeavoring to attract students by making the cause "popular" is still the prevailing one. The fallacy of this theory will, we think, before long be fully demonstrated. Nearly all our medical schools have plenty of talent and plenty of clinical material at their disposal, but neither of these can be put to its best use without proper organization. A course of study which carries the student progressively and systematically from one subject to another in a just and natural order, and which is followed by rigorous examinations, enforces a mental discipline which is of incalculable benefit to him, and insures a thorough training in certain branches of medical instruction which could not be acquired under any other system. This training is of special importance in the early years of a student's life, and paves the way for the work he has before him in the hospital wards.—*Boston Medical and Surgical Journal.*

Reform in Medical Education.—The lively competition among our medical colleges has begotten a disposition to rest their respective claims for superiority upon the size of their classes and the number of their graduates. This has certainly a very dangerous bearing upon the progress of medical education. So long as it is conceded that the number of matriculants settles the respectability of any given college, there is always an ambition among rival institutions to get all the students they can. The temptation to resort to questionable means to gain this patronage is not always resistible, even by professors whose consciences are tender upon every other subject. The question seems not to be, How can we narrow the attendance upon our medical schools to a first-class standard of fitness? but, How far can we go in order to insure the greatest number of names in our catalogues? When quantity is so much the primary consideration with our medical institutions, it is easy to see how strongly the current sets against mere quality; in other words, wherein lies the objection to the enforcement of some regulation requiring a preliminary examination on the part of those who seek admission into the schools.—*New York Medical Record.*

DENTIGEROUS CYST IN THE UPPER JAW.—R. D., aged eighteen, a healthy-looking girl, residing at Morecambe, came under my care for the treatment of a tumor occupying the right cheek, forming a projection into the nose, filling up the canine fossa, projecting outwards under the malar eminence, and encroaching on the mouth. In the latter position, it was found to occupy the space of the right lateral incisor, canine, and first bicuspid teeth, which were wanting. The alveoli corresponding to the former two were found to be dilated (for, although three teeth were absent, yet there were to be found only two alveoli), and the edges of the alveolar plates could be distinctly traced, having projecting through them a soft semifluctuating tumor, on the surface of which ramified numerous large veins. The movement of the upper lip was considerably interfered with. The tumor had existed for about three years. The appearance of the girl's face was peculiarly that produced by a dilatation of the antrum of Highmore. There was not much pain, and the voice was rather nasal. An exploratory puncture through the dilated alveolus by means of a canula and trocar let out a small quantity of bloody serum. No distinct fluctuation could be made out between the most prominent parts of the swelling and the projection into the mouth.

On November 12th, 1874, the cheek having been raised from the front of the upper maxilla (under chloroform) without any wound of the external skin, the tumor was easily perforated by a gauge, and the opening enlarged by a pair of nibbling forceps sufficiently to admit the finger into the antrum, which was found to contain a clot of blood and some serum, the former being the result, no doubt, of the late exploratory puncture. On passing the finger into the cavity, a hard, pointed substance was found projecting from the roof of the antrum, about a quarter of an inch from its posterior wall, and, after a few forcible but vain attempts, a fully developed canine tooth was removed by the forceps. The cavity was filled with lint and the patient sent to bed. Her progress towards recovery was uninterrupted, and, on January 16th, there was only a slightly fistulous orifice at the junction of the lip with the upper jaw. The distortion, which continued as great as before the operation, has been much reduced by pressure obtained by wearing a small India-rubber ball firmly bandaged on the cheek during the night; and the projection into the mouth has shrunk very much; indeed, now there is scarcely any distortion left.

The tooth which was removed from its abnormal position is in all respects a well-developed canine (permanent) tooth measuring barely four-fifths of an inch, the crown being exactly three-tenths of an inch long. The fang, however, instead of having a smooth surface similar to that found in most teeth, is surrounded by a firm deposit of bone, giving one the idea that it was not implanted in an ordinary alveolus or socket, but rather anchylosed to the bone in which it was found. It appears that, some time ago (how long she could not say), according to the girl's statement, she had her "eye-tooth" on that side removed; that it was a "sucking tooth"; and that the corresponding tooth in her permanent set never appeared. The lateral incisor and first bicuspid teeth were extracted at a much later period, with a view to the cure of the tumor. How the tooth got into the position in which it was found is very difficult satisfactorily to explain; but it would appear not improbable that, in the extraction of the primary tooth, some damage had been done to the pulp of the secondary tooth, and that the germ had been lifted out of its normal position and carried, so to speak, on the top of a cyst formed by a morbid secretion in the dental sac, through the antrum, and so taken root in the orbital plate of the superior maxilla, where it was found.

The case mentioned in Bryant's "Surgery," page 279, is somewhat similar to the above, save that in it the tumor was formed by a solid instead of a fluid growth. The engraving on the same page gives very fairly the peculiar external appearance of the above case.—*A. W. Stocks, M.R.C.S., in British Medical Journal.*

Fibro-Fatty Tumor.—Mr. Wood showed also a specimen of fibro-fatty tumor of the zygomatic fossa, removed from a boy aged twelve. The tumor had caused marked outward bulging of the zygoma and outward displacement of the angle of the lower jaw, while within the mouth it had pushed the alveolar border of the superior maxilla inwards, so that the opposing rows of teeth were separated by an interval of an inch. The tumor had been growing for five years, and treatment by pressure, puncture, painting with iodine, etc., had been tried before the patient came under Mr. Wood's care. The operation performed to effect its removal was as follows: An incision two inches and a half in length was made in the line of the wrinkles on the temple, dividing the anterior branches of the temporal artery, through the temporal muscle. Another incision was made inside the mouth to the inner side of the duct of Steno. The fingers being introduced within the ramus of the jaw and the zygoma, the limits of the tumor were readily defined. It was then removed, partly above the zygoma and partly through the mouth; and, except for its firm attachment to the zygomatic ridge, its extraction was effected without difficulty. The cavity left was well sponged out with chloride of zinc, and a drainage-tube inserted. The patient made a good recovery. Pressure by means of bandages is being applied to the zygoma to restore its shape. The general characters of the growth were those of a fatty tumor; but some of the cells met with in it resembled those found in nasal polypi.—*London Pathological Society Reports, in the Lancet.*

A Calculus of Steno's Duct.—M. Paquet reported to the Chirurgical Society of Paris the case of a man, fifty-two years of age, who had had repeated attacks of inflammatory swelling of the cheek and malar region. The abscess had already opened several times into the mouth before the patient came for treatment. The surgeon found a swelling of the duct of Steno, which was ulcerated at its edges, and he was able, by means of a curette, to extract from its orifice an ovoidal flattened calculus, weighing one gramme, which was followed by the escape of a large quantity of pus. Injections were made into the seat of trouble, and a rapid cure was completed. The examination of the calculus presented an interesting point in regard to etiology, for in its center was found a grain of wheat.—*Medical and Surgical Reporter.*

SALIVARY CALCULUS THE CAUSE OF AN INFLAMMATION OF THE VELUM PALATI AND THE BASE OF THE TONGUE (*Le Progrès Médical*, July 10, 1875).—M. Gouguenheim reports the case of a man æt. 35, subject to winter cough, but presenting neither the rational nor physical signs of tuberculosis. He complained of a pain in the throat, at first slight, but becoming more and more intense. There was a slight redness of the soft palate and its arches, but no change in consistence could be recognized by the touch. The pain became more severe whenever, during the examination, the base of the tongue was depressed. He was tormented by incessant movements of deglutition, and complained of a continual spasmodic sensation in the throat. At the end of four days the pains, which were growing intolerable, suddenly ceased, after the evacuation of an elongated cylindrical concretion, a little more than a centimeter in length. It was of a dirty-yellow color, and was formed of a number of layers of organic and inorganic matter disposed in a concentric manner. It was found on examination to be a salivary calculus, and had probably been lodged above the aryteno-epiglottidean folds or behind the greater cornu of the hyoid bone. J. W. W.—*Philadelphia Medical Times.*

SALIVARY CALCULUS IN THE PAROTID DUCT (*Edinburgh Medical Journal*, March, 1875).—Mr. Joseph Bell reports the case of a young lady, æt. 23, who for five months noticed a hard swelling in her left cheek, far back, nearly opposite the last molar tooth. There was not much pain except at times, when the tumor increased in size. There was much thickening of mucous membrane, and a constant discharge of pus into the mouth. There was also considerable fetor. The mucous membrane was red, swollen, and at one point a most malignant-looking fungous mass of granulations protruded. A gum-boil was supposed to have originated the mischief. Finding that all the pus came from one point, Mr. Bell passed in a fine grooved probe and succeeded in striking a hard mass at about the distance of an inch from the opening. Next day she was put under chloroform, and by slitting up Steno's duct to the distance of nearly an inch, it was found possible to dislodge and remove a pear-shaped salivary calculus, about the size of a hazel-nut. A very rapid recovery from all the symptoms ensued, and no deformity whatever remained.—*Philadelphia Medical Times.*

GELSEMINUM SEMPERVIRENS IN ODONTALGIA (*The Practitioner*, August, 1875).—Dr. James Sawyer has rarely found gelseminum fail to give decided and lasting relief in cases of neuralgic pains in the face and jaws associated with carious teeth. He usually gives every six hours fifteen minims of a tincture made in the following manner: Take of gelsemia root, in coarse powder, two ounces; of rectified spirit, twenty fluidounces. Moisten the powdered root with ten ounces of the spirit, and allow the mixture to stand for twenty-four hours. At the end of that time pack in a percolator, and add the remaining ten ounces of spirit. When the fluid has ceased to flow, remove the contents of the percolator and press them. Add the pressed liquid to that obtained by percolation, filter, and make up with rectified spirit to a pint. Eleven minims are equal to one grain of the root. There is only a trace of tannin in the tincture, which may be given with any of the preparations of iron.—*Philadelphia Medical Times.*

CELLULOID.— I have heard some complaints made about the plaster adhering to the celluloid plates.

While pressing them, if you will use a light coating of sweet oil this difficulty will be entirely obviated.

If the cast is very dry, oil it a second or third time. It will do no harm, and your plates, after pressing, will come out perfectly clean.—*B. Q. Stevens, in Missouri Dental Journal.*

PROTECTION OF IRON AND STEEL TOOLS AGAINST RUST.—Vogel recommends a solution of white wax in benzine. The latter, heated, will dissolve half its weight of wax. This will preserve the metal, even from the action of acid vapors. Apply with a brush.—*Scientific American.*

HINTS AND QUERIES.

AN OLD SUBSCRIBER, who asks how to prevent the rubber from showing through the joints of front blocks, is recommended to try filling the joints before packing the rubber with oxychloride of zinc.—M.

G. J., who asks a remedy for the trouble he has experienced from the plaster cast changing shape in the manufacture of celluloid plates, is recommended to take an impression of the plaster cast in sand and run a tin model.—P.

PUSHING OUT OF FILLINGS.—Many theories have been advanced as to the cause of the loosening of amalgam fillings. Some time since I filled several cavities with amalgam for a patient, and owing to hurry one of them was not thoroughly dry before the filling was inserted. At a subsequent examination all of the other fillings were in good condition, but that one had been "pushed out" of the cavity. May not this result have been caused by the moisture? The external or enamel surface being dry and the dentine moist, would not the effect be that the filling would be pushed out by the expansion of the moisture? and cannot the aching which is sometimes experienced after the insertion of an amalgam filling be thus accounted for?—C. R. T.

THIRD DENTITION.—Mr. T., a native of Germany, aged sixty years, called upon me April 14th, and I extracted for him seven roots and a right upper canine to prepare the mouth for the insertion of an upper set of teeth.

On June 12th, the gums having healed satisfactorily, I took a plaster impression of the upper jaw, and made a celluloid plate. The patient living in New Jersey, did not call again until August 7th. To my surprise the plate did not seem to fit, and upon examining for the cause, I found that a new tooth had begun to erupt in the place which had been occupied by the superior right *dens sapientiæ.* Two cusps were already through. Of course, this explained the reason why the plate did not fit. The patient expressed himself satisfied, paid for the plate, and promised to let me see the tooth after it was fully erupted, when he would make up his mind whether to have it extracted or not.—J. O. URBAN.

THE
DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,
FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

(Continued from page 469.)

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the Office of the Librarian of Congress at Washington.]

III. CAVITIES which contain semi-decomposed dentine of horny consistence.

It is in this class of cavities that we will find the greatest interest, the most marked necessity for close discussion, the most decided need for scrupulous observation. and the most practical importance to attach to every varied step in each individual operation.

I wish at this time to repeat the assertion which I have made in a general manner in relation to *deep-seated caries*, viz.: *that a tooth containing such cavity is in a most accurate balance between comfort, health, and long-continued usefulness; and discomfort, disease, and more or less frequent annoyance, with no guarantee for its duration from year to year.*

I wish to impress this, especially in this connection, for of all teeth, those under this present discussion are the most critically situated.

I have intimated that teeth with cavities of the first class—those containing soft, white, pulpy, decayed dentine—will seldom repay with success the efforts made to maintain the integrity of pulp vitality; and I have also intimated that those with cavities of the second class—containing decay of various grades of discoloration, from yellowish, grayish, and brownish, even to black—will comparatively often repay, with the desired success, efforts which are far less skillfully directed; but it is worthy of notice that this third class of cavities are those which *demand for their treatment the knowledge and skill of the dentist just in proportion as he has these attainments to bestow.*

By this I mean that while the practitioner of limited ability finds it necessary to bring into requisition his every resource for the combating of such untoward agencies as *he* recognizes, the practitioner of the greatest erudition, and possessed of the most distinguished manipulative ability, *finds it no less necessary* to exhaust to the uttermost his varied attainments in the endeavor to antagonize the legion of adversaries which, from his advanced outlook, *he* finds arrayed against him.

For this reason I propose treating of this third class of cavities of deep-seated caries in a degree of fullness which will necessitate a certain amount of repetition that I trust will be not only pardoned, but welcomed, for the greater completeness which will be thus assured.

For this reason, also, I wish to be distinctly understood as endeavoring to maintain the *typical* character of this third class of cavities in relation to deep-seated caries, while I necessarily mention much in connection with them which pertains in a general way, already sufficiently indicated, to the cavities of the first and second classes.

Although it is not a universal concomitant of even deep-seated caries that *odontalgia* should exist, it is nevertheless the case that it usually is present in greater or less degree.

It may probably be regarded as one of the first reasons for selecting the third class of deep cavities as typical, that pain is more usually found associated with these than with cavities of the other two classes. This is ascribed to the fact that, *while exceptions occur*, it is generally the case that the pulps of the soft white teeth are less responsive to irritation, and therefore less likely to produce pain; while the pulps of the teeth of the second class have that vigor which enables them to protect themselves to that extent which precludes the liability of pain, except upon occasions of extraordinary irritation.

Teeth of the third class, on the contrary, seem to possess a quality of dentine which is not only liable to be sensitive, as the result of being incipiently carious, but which possesses markedly an organization capable of transmitting irritating impressions to the pulp.

In addition to this, we find in these teeth pulps which, from their irritability, are easily impressed to a degree provocative of pain; thus I shall give, as the

Second cause of odontalgia: slight irritation of the dental pulp before exposure.

The causes which are recognized as liable to produce this condition in connection with deep-seated caries are:

a. Mechanically.—Impacting of food or other material exerting pressure.

I place this cause first, because, although it is a *possible* irritant, it is yet not a *probable* one. Its existence may give rise to trouble; but, except in conjunction with sensitiveness of the dentine, it is not usually an irritant of sufficient power to induce odontalgia.

It should be noted, however, that when this complication of sensitive dentine does exist, and when, in consequence of the combination, odontalgia of the *second* form is induced, the fact is clearly announced by marked difference in symptoms from those given as diagnostic of the existence of sensitive dentine alone.

b. Chemico-vitally; food putrescing.—When this decomposition is occurring with decided acid evolution, it is a fruitful cause of pulp irritation. Particularly may I notice under this head the decomposing of seeds, as of berries, tomatoes, raisins, etc., which, lodging and remaining almost like a filling (being frequently mistaken by patients for such) in cavities of decay, give rise to intermittent or continued pain until removal.

c. Vitiated fluids of the mouth.—These, like food, are liable to induce odontalgia only when possessed of notable acidity. The appearance of this peculiar form of vitiation in the oral fluid is sufficiently remarkable to attract almost instant attention, and consists of a glairy viscidity, which, in its transparent consistency, permits of long attenuation, like the *thread of the spider's web.*

In marked cases the saliva may be drawn out into these fine threads to the length of many inches.

d. Introduction of hot or cold materials.—This is also an almost constant cause of pain; and it will usually be noticed that *cold* is most frequently cited as inducing trouble. This is due to the much greater deviation from the normal temperature of the mouth which is agreeable in the direction of *cold*, than is even endurable in the direction of *heat;* for, taking 98° as blood heat, we find that ordinary ice-water is about 40°, a difference of nearly 60°; while the hottest tea or coffee will seldom exceed 140°, and is then merely sipped, at a difference of but little more than 40°.

The passage of cold air, as the drawing in of the breath through the mouth, will frequently prove an irritant sufficient to induce pain; particularly is this the case in the incisors and cuspids of the superior jaw, and as far back as the bicuspids in the inferior jaw, from the greater facility in exposing the lower teeth by depressing the angle of the mouth.

e. The infiltration of salt, sweet, or sour condiments.—This will often be a guide to the existence of pulp-irritation in deep-seated cavities, and it will be noticed that, whereas in *crevices* containing sensitive dentine it is generally necessary that these irritants should be forcibly squeezed into contact by mastication, it is only needed in such cases as we are now considering that they should be taken into the mouth and, by gentle infiltration, become irritating.

Symptoms: uneasy sensation; positively located; greatest at periods of recognized irritation; no sharp paroxysmal attacks; no increase *of pain upon pressure on tooth ; no throbbing.* In cases presenting these indications it may be regarded that a favorable prognosis may be indulged, provided no "spontaneous" pain (pain occurring in the absence of any tangible irritant) of much moment has been felt.

Without again entering into detail concerning the general conditions of these cavities, I would suggest reference to the six or eight paragraphs which comprised the first considerations pertaining to "deep-seated caries ;" and having, as the result of these, given a washed and dried cavity of the third class, I shall continue the discussion of the advisability or non-advisability of leaving other than perfectly healthy dentine in cavities of decay.

The time is entirely within the memory of many practitioners of the present day when even a discussion of this topic would have been regarded as worse than waste of words. "Thorough preparation" was the doctrine; and by *thorough* preparation was meant, as stated, the removal of every particle of decay.

It was then, with no ordinary temerity, that Prof. Robert Arthur first promulgated the teaching that this was a subject open for controversy, and intimated his conviction that the thorough removal of decay was not a *thorough performance of the duty of an intelligent dentist!*

In his work entitled "Treatment of Dental Caries complicated with Disorders of the Pulp," published in the year 1853, he says, page 46: "I deny positively the truth of the statement, so often made, that caries of the teeth will always continue to progress after it has once set in unless every particle of the decayed bone be removed from contact with that which is healthy. I do not believe, when the cavity of decay is so filled as absolutely to prevent ingress of the fluids of the mouth, that the disease ever advances, although my observations upon this point are not sufficient to furnish me with decisive proof that it is so.

"But I do affirm with confidence that a series of observations, running through a practice of ten years, have convinced me that in a vast majority of cases caries of the teeth remains stationary if the opening of the cavity of decay is well prepared and the cavity so filled as to exclude everything from it, although decayed, dead, and decomposed bone be left in it."

It was at the suggestion of Prof. Arthur, some twenty years ago, that I instituted the same systematic investigation in this direction that he had for so many years previously pursued ; and, as I recall the warnings which were so kindly given me by those whom I regarded as in the front rank of my profession, I cannot but be grateful in the remembrance of the calm but earnest manner in which he successfully urged me to commence so great a deviation from what was recognized as accepted practice.

At this time I shall sufficiently define my own position by the statement that, as the result of all these years of experience, I find quite frequent necessity for the adoption of the practice, and have many hundreds of teeth under my charge which to-day are rejoicing their possessors by their natural translucency, instead of increasing the number of the host of discolored and not entirely satisfactory results of the former method of *thorough* excavation.

In this connection, and before entering upon the detailed consideration of the subject, I cannot refrain from mentioning that view of this matter which at one time seemed a powerful objection in the minds of some, and which is even yet urged against the adoption of a practice which has proved so admirable in so many doubtful cases.

This is the danger of the tendency to the performance of imperfect operations.

In answer to this, I would say that it has seemed to me, in the observance of the practical workings of the suggestion, that it has only added to the care and perfection with which *all* operations are performed by those to whom it has given the possibility of producing better results in this one direction than they had ever been able to accomplish before.

Having advocated the chemico-vito-mechanical theory of caries, with its concomitant fungi, it would naturally be inferred that I incline to the opinion that the decay of teeth must be largely due to agencies external to these organs, and that while I recognize the important influence exerted by the structure of tooth-tissue in deciding the character of their decay, I nevertheless have sought to maintain the opinion that outside excitants were such formidable, persistent, and prolific causes of trouble that they were *the most assiduously to be antagonized.*

(To be continued.)

DENTAL EDUCATION.

No. 5.

BY R. ARTHUR, M.D.

In the last number of these papers I stated that the treatment of dental caries naturally separated itself into two broad divisions, viz.:

1st. That in which entire and unrestricted control is had of the cases from the earliest period.

2d. That in which the service required is occasional, or applicable only when caries has made considerable progress.

The preservation of the teeth involves, of course, everything which may or can be done to accomplish the object. The subject of hygiene is one of the utmost importance, and should receive most careful attention from the teacher of operative dentistry. Instruction upon the subject of dental hygiene does not merely mean to say that the teeth must be brushed and floss-silk passed between them several times every day; it involves a great many important considerations, to which I cannot now refer, but which are well known to all who have given any thoughtful attention to the subject. But it will be admitted that the most persistent attention, from the earliest period, to every particular at all available in this way, is necessary to accomplish the best results.

But, while this subject demands the most careful attention, and hygienic measures are always of great value, their usefulness as regards general application is very limited. But when hygienic measures fail or are found to be inapplicable in any particular case, then it is generally admitted that the only resort is to operative treatment of some sort. This, to be most effective, must be resorted to at the earliest period after the attack of caries. Perhaps I am too hasty in making this assertion, as this has been denied by a great many, who consider it better to permit considerable destruction of the dentine to take place before attempting to arrest the progress of caries. A large majority, however, of the most competent practitioners of dentistry agree that in many cases, in the early stages of the attack, caries may be arrested by its careful removal, and by leaving the surfaces, previously in close contact, permanently separated in such a manner as to be self-cleansing, or to require the least amount of attention.

The extent to which the extraction of some of the teeth in early life may be employed as a prophylactic measure is a question with regard to which wide differences of opinion exist. It is a subject demanding the most thorough and careful discussion. How far it is admissible, and to what extent it may be advisable, are questions which cannot be lightly passed over. They involve considerations of very great importance.

The artificial separation of the teeth is a subject which will claim full attention. To what extent is this practice, which has of late led to so much earnest discussion, admissible, and to what extent can it be employed with advantage? Whatever the teacher's opinions may be with regard to this matter, it is too important to be passed over without the most careful attention.

A teacher is compelled, as he should feel it his duty as a practitioner to do, to examine closely all new theories and inform himself of their real merits. However he may satisfy himself for giving no attention to new views in his own private practice, he will be held bound as a teacher to investigate all those of sufficient importance to attract attention, and to expose their fallacies if they exist, or to point out their advantages and claims to confidence if they possess any. Continual and rapid progress is being made in all vocations of life, and he will be pronounced by intelligent men as having no business in the position of teacher unless he keeps abreast of the advances being made in his special pursuit.

He comes, then, to the means of rendering this service if he considers the practice admissible. How can artificial separations of the teeth be best made? This brings him to the means which have lately been devised for the purpose. The various dental engines now in use are to be explained, and among these the electric engine. This at once opens a subject to which a great deal of intelligent attention must be given, viz., electricity and electro-magnetism. If this subject had been understood in the dental profession, the very beautiful improvements now within the reach of every one would not have lain so long neglected. But the galvanic battery has its peculiarities and difficulties of management, which, although simple enough, require no little explanation to make them plain to those who are entirely ignorant of them. It is true that this branch of the subject may be taken up by the professor of chemistry, and probably would be. But the construction of these engines must be explained, in order that difficulties which attend their use may be comprehended, so that they may be met and overcome. The principles of electro-magnetism are so involved with such an explanation that they cannot be passed over by the teacher of this branch. He cannot avoid the subject. He must demonstrate, too, the manner of using these instruments. This whole subject will demand considerable time, and, whatever may be thought of it now, it will, before a great while, appear that these engines are too valuable to be lightly treated. I am satisfied, from an extended experience in their use, that it will not be many years before they will be found indispensable to all who can surmount the slight difficulties which attend their use, and which result from defects that will certainly be overcome in time.

For considerably more than two years I have been employing Green's electric engine every day I have operated. I never take up the instrument without a feeling of admiration for its beautiful and effective qualities. It is an implement of unequaled capabilities, for our purposes, as compared with anything now known. We have in it *power*, in the compass of the hand, without any intermediate machinery. This power is applied by the mere attachment of its slender conductors. It is always ready, and with a properly-constructed battery, or even with the batteries now well known, if understood and kept in good order, *never fails* to respond when the connection is made. It may stand weeks or months unused, and when needed the mysterious power lying dormant within it can be instantly roused into action. No fire is to be made, no steam generated, no valves are to be kept in order, no possibilities of explosion, or danger of any kind to be apprehended. It is a most efficient servant, and always ready to obey the touch of the master's hand. Surely the time must soon come when electro-magnetism will be employed for many forms of motors. The instrument itself, moved by this wonderful agent with great comparative velocity, performs the service required with unequaled advantages. The instruments employed with it cut with surprisingly little pressure or friction, and the torture attendant upon the removal of sensitive dentine very nearly disappears from the operation. Direct in its action, it is free from the vibrations attendant upon the best methods now known for transmitting power from a straight line. As its motion is independent of any personal effort of the operator, his whole attention can be directed to his delicate manipulations. As it has no attachments interfering with its movements, it can be employed in any position without the aid of an assistant. Although its velocity is very great, its power is comparatively slight; it is entirely under control, and can be stopped in an instant by the touch of a finger. Requiring no force from the operator, it saves a great deal of wearing labor or the expense of an assistant.

However well satisfied a teacher of operative dentistry may be with his own methods and appliances, his position exacts from him, as I cannot repeat too often, an intimate acquaintance with all methods and with all alleged improvements. He must keep fully up with the advances made, and must fully instruct his classes with regard to them. The "mysteries" and "irregularities" of a galvanic battery are mysteries and irregularities to those only who are ignorant of its construction and careless about fully informing themselves in relation to it. In any of its forms it is a very simple device, and the individual who is not able to understand and explain its peculiarities is little fitted for the position of teacher of operative dentistry. The student must be so well informed upon such subjects that he may avail himself of their advantages if he thinks proper to do so and may be in a position to make improvements in the same direction.

The great means now relied upon for the treatment of caries after it has advanced beyond the period when it can be arrested by the remedy indicated—that of obliterating by filling with some indestructible substance the cavities which result—must come under consideration. This is a subject which has engrossed the attention of the dental profession during its existence. One of the first inquiries will be as to the materials best adapted to the purpose. Of these it is well known there are a number.

It must be conceded that there has been much prejudice, comparatively, and little research involved in the attention given to this subject Recently an advanced spirit in this direction has been manifested, and has become general. It has been claimed, and with evident reason, that while gold is beyond question the best material yet discovered for this purpose, it has manifest objections. And while it is conceded that for general use no substance is comparable with it, yet there are cases continually presenting themselves in which other well-known materials are superior.

The time has arrived in the progress of knowledge when the dictum of any individual has but little value. He must in any position, but especially in the responsible one of teacher, explain himself clearly; and in order to do so must make himself thoroughly acquainted in all its particulars with any subject upon which he undertakes to give instruction. With the one now under consideration, he must be able to explain the nature and peculiarities of substitutes employed for gold, and to show such advantages as other materials may offer.

Recently the subject of amalgams has attracted a great deal of attention. The investigation of this subject, so far as it has gone, has led to a considerable modification of views formerly very tenaciously held. But what has been done recently in this matter shows how much more remains to be done. A teacher of operative dentistry, if he approaches the demands of his position, will find a wide field of experiment and research before him in this field, and what he accomplishes, in an advanced way, and in the full presentation of what has been done, will occupy considerable time before his class.

The preparations of zinc, now so frequently employed, open another field for research and instruction. That they are sometimes useful cannot be denied; that they may become more so is more than possible. The subject of plastic substances for filling carious teeth is one of great interest, and may eventually lead to a substitute for gold, for which all look as a desideratum. A dental student should be well informed on this subject, so that he shall be prepared to make investigations which may lead to further and important advances in this direction.

But when we come to the consideration of gold for the purpose in question, many important points require discussion. No subject is at the present time of greater importance to the practicing dentist. A searching examination into the nature and peculiarities of this metal must be made. Since the peculiar cohesive or welding properties of pure gold have become known, marked improvements have been made in the gold foil. It is a different material, in many respects, from that which was in use before the commencement of the period referred to.

A number of forms of gold differing widely in their peculiarities have been produced and used. Soft gold, cohesive gold (differing in degrees of cohesiveness), crystal gold, plastic gold, shred gold, rolled gold (for which are claimed superior working qualities to the beaten metal). All these must be made subjects of careful investigation and explanation to the student.

It is stated by manufacturers of gold that its cohesive properties do not depend entirely upon the purity of the metal, but upon some peculiarities of manipulation in the process of manufacture. This should be investigated and clearly explained.

Plastic gold, under whatever name it may be classed, deserves the most careful attention. Superficial and prejudiced men have violently condemned the material *in toto.* But it has been extensively employed, with success. It possesses certain qualities of great value for our purposes. Its ready adaptability to the cavities to be filled; its freedom from the annoying and sometimes serious difficulty of the retention of the first portions of a filling; its very convenient working qualities, are obvious advantages possessed by it. But serious defects, understood by most of the readers of the DENTAL COSMOS, have banished it from general practice.

But, although I have employed it but little recently, I am satisfied that it does not deserve this ostracism. It still deserves careful study. One form of this species of gold, no longer attainable, I used exclusively for more than a year, so long as I could get it of good quality. I have no hesitation now, after having observed the condition of operations performed with it, after the lapse of some six years, and after having carefully tried every form of gold accessible, in declaring it the most perfect I have ever used.

A teacher of operative dentistry should be capable of presenting fully all that is known upon this important subject, and to do this no little time must be given to it in his course of instruction.

We pass, then, from this careful consideration of the materials for filling carious teeth to the methods of employing them. I need not say that this is a topic of great breadth and one to which I can give but brief attention. A great variety of methods have been and are now employed. So far as any of them possess merit, they must receive full attention and must consume a great part of the course. But space does not permit me to extend this detailed examination any further. Many subjects, however, might be referred to more fully than is now in my power. I will merely mention treatment of the pulp; of alveolar abscess; of affections of the antrum; extraction of teeth; fractures of the maxillæ; neuralgia, etc.

I regret to be obliged to ask indulgence for the crude and imperfect character of the foregoing articles. This is partly to be attributed to a protracted indisposition, which has rendered the work a very laborious and distasteful one. I trust that the subsequent papers will atone for the deficiencies of those which have appeared, which are indeed but preliminary to the thorough examination which I propose to make of the present system of dental education in this country.

ORAL ORGANISMS.

BY J. H. M'QUILLEN, M.D., D.D.S.,
PROFESSOR OF PHYSIOLOGY IN PHILADELPHIA DENTAL COLLEGE.

(Read before the Pennsylvania State Dental Society, Tuesday, July 13th, 1875.)

THE prominent part assigned by some observers to the oral organisms, or parasites, so called by many, be they vegetal or animal, in the production of decay in the teeth, and, on the other hand, the emphatic denial by a number of careful and reliable investigators that they have anything at all to do with the matter, make it necessary that we should inquire into the origin of the belief that they are active agents, and ascertain for ourselves by actual observation whether that belief will stand the test of rigid investigation. That we may take a broad and comprehensive view of the subject it will be necessary to become acquainted with the nature and variety of the parasites that infest other portions of the body, and whose presence is not only a constant source of annoyance, but, in some instances, produces great constitutional disturbance, often ending in death. On this point the following extracts are made from the works of Sir Thomas Wattson and Herbert Spencer.

Sir Thomas Watson* says: "It seems as strange as it is a somewhat humiliating fact that the human body should furnish food and a habitation for many of the inferior creatures: not only after death but while it is yet alive. It is a notorious fact that numerous parasites do crawl over our surface, burrow beneath our skin, nestle in our entrails, and riot and propagate their kind in every corner of our frame; producing oftentimes such molestation and disturbance as require the interference of medicine. Nearly a score of animals belonging to the interior of the human body have been already discovered and described, and scarcely a tissue or an organ but is occasionally profaned by their inroads. Each has its special or favorite place of domicile. One species of strongle chooses the heart for its dwelling-place, another inhabits the arteries, a third the kidney; myriads of worms lie coiled up in the voluntary muscles or in the areolar tissue that connects the fleshy fiber,—the *Trichina spiralis*. The Guinea-worm and chigoe bore through the skin and reside in the subjacent reticular membrane. Hydatids infest various parts of the body, but especially the liver and the brain. A little *fluke*, in general appearance much like a miniature flounder, lives, steeped in gall, in the biliary vessels. If you squeeze from the skin of your nose what is vulgarly called a maggot,—the contents, namely, of one of the hair-follicles,—it is ten to one that you find in that small sebaceous cylinder several animalcules, the *Demodex foliculorum*, extremely minute, yet exhibiting under the microscope a curious and complicated structure. Even the eye has its living inmate."

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* Practice of Physic, Sir Thomas Watson, p. 825.

Herbert Spencer* says: "Of the animal kingdom as a whole more than half the species are parasites. 'The number of these parasites,' says Professor Owen, 'may be conceived when it is stated that almost every known animal has its peculiar species, and generally more than one, sometimes as many as, or even more kinds than, infest the human body.' Passing over the evils thus inflicted on animals of inferior dignity, let us limit ourselves to the case of a man. The *Bothriocephalus latus* and the *Tænia solium* are two kinds of tape-worm which flourish in the human intestines; producing great constitutional disturbances, sometimes ending in insanity; and from the germs of the tænia, when carried into other parts of the body, arise certain partially-developed forms known as cysticerci, echinococci, and cænuri, which cause disorganization more or less extensive in the brain, the lungs, the liver, the heart, the eye, etc., often ending fatally after long-continued suffering. Five other parasites, belonging to a different class, are found in the viscera of man,—the trichocephalus, the oxyuris, the strongylus (two species), the ancylostomum, and the ascaris; which, beyond that defect of nutrition which they necessarily cause, sometimes induce certain irritations that lead to complete demoralization. Of another class of entozoa, belonging to the subdivision trematoda, there are five kinds found in different organs of the human body,—the liver and gall-ducts, the portal vein, the intestines, the bladder, the eye. Then we have the *Trichina spiralis*, which passes through one phase of its existence imbedded in the muscles, and through another phase of its existence in the intestines, and which by the induced disease *trichiniasis* has lately committed such ravages in Germany as to cause a panic; and to these must be added the *Guinea-worm*, which in some parts of Africa and India makes men miserable by burrowing in their legs. From this list of entozoa, which is by no means complete, let us pass to the epizoa. There are two kinds of acari, one of them inhabiting the follicles of the skin, the other producing the itch. There are other creatures that bury themselves under the skin and lay their eggs there; and there are three species of lice which infest the surface of the body. Nor is this all: besides animal parasites there are sundry vegetal parasites which grow and multiply at our cost. The *Sarcini ventriculi* inhabits the stomach and produces gastric disturbance. "The *Leptothrix buccalis* is extremely general in the mouth, and may have something to do with the decay of the teeth. And besides these there are microscopic fungi, which produce ring-worm, porrigo, ptyriasis, thrush, etc.

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* Principles of Biology, Herbert Spencer, vol. i. p. 342.

"Thus the human body is the habitat of parasites, internal and external, animal and vegetal, numbering, if all were set down, some two or three dozen species; sundry of which are peculiar to man and many of which produce in man great suffering and not infrequently death. What interpretation is to be put on these facts by those who espouse the hypothesis of special creations? According to this hypothesis all the parasites were designed with a view to their respective modes of life. They were endowed with constitutions fitting them to live by absorbing the juices of the human body; and they were made prolific in an almost incredible degree that their germs might have a sufficient number of chances of finding their way into the human body. In short, elaborate contrivances were combined to insure the continuance of their respective races, and to make it impossible for the successive generations of men to avoid being preyed upon by them. What shall we say to this arrangement? Shall we say that man, 'the head and crown of things,' was provided as a habitat for these parasites? Or shall we say that these degraded creatures—incapable of thought or enjoyment—were created that they might cause unhappiness to man?"

Without pretending to consider the pertinent question propounded by Mr. Spencer, as it is not relevant to the subject we have under consideration, the fact that the human body is the habitat of a great variety of parasites, entozoa and epizoa, which cause great annoyance to man, must be evident to every reader. The recognition of the disturbance and havoc caused by the presence of parasites in other organs of the body is, no doubt, the origin of the belief that the forms of life found in the oral cavity are active agents in the development of dental caries. In the mouth of man several species of organisms or parasites find a place of habitat. For years the nature, origin, and action of these have been a constant object of microscopical investigation and of thought with me. The saliva, the soft, cheesy-like accumulation found on the teeth in the morning on rising, similar deposits on artificial plates, and decay cut from carious cavities have been over and again examined by me at all hours of the day and night with low and high magnifying powers. Although these observations have been mainly carried on alone, on frequent occasions my friends have had opportunities of watching with me the movements of the tiny beings under the microscope, viz.: the monads, the smallest particles of matter possessing life discernible by the highest magnifying power, having a round or oval shape and great activity of movement, due to the action of cilia; the bacteria, the vibriones, the spirillum, with its rapid spiral or screw-like motion, the *Leptothrix buccalis*, and the *Protococcus dentalis* have been carefully studied.

The rapid and apparently voluntary movement which some of these organisms make would seem to indicate an animal nature, but it is exceedingly difficult at times to decide between what is animal and what is vegetal when examining the lower organisms. I incline to the opinion that some of the oral parasites are animal. The vegetal character of others is beyond dispute. In accounting for their origin it is not necessary to attribute it to spontaneous generation, since it is reasonable to infer that the germs have been introduced to the mouth either by the air, water, or food ; for the air we breathe, the water we drink, the food we eat, and the earth we tread upon are alive with myriads of microscopical beings which could be readily introduced into the mouth and remain there as a place of habitat. If you want evidence of this fact take a drop of stagnant water, place it under the microscope, and the monads, bacteria, vibriones, and spirilla will be observed in active motion, and resembling in every particular those found in the mouth of man. A few weeks since I demonstrated this fact to a number of friends at a meeting of the Odontographic Society of Pennsylvania. In illustration of this, the *Protococcus dentalis*, or green fungus, which seems to be so destructive to the teeth of children, resembles very much the *Palamoglœa macrococca* of Kützing, which spreads itself as a green slime over damp stones, steps, and walls ; while the *Protococcus pluvialis*, another plant belonging to the same species, is found in every pool of water, the spores of which must be always floating in the air, as it appears after every shower of rain. The *Leptothrix buccalis*, regarded by some observers as aiding the action of acids in the formation of dental caries, is believed by Haller and others to be one form of penicilium, the commonest fungus found on decaying vegetal substances of all kinds, especially on semi-fluid or liquid matters. Again, the *Oidium albicans* found in the saliva of persons suffering from aphthæ, and which can be most readily obtained for microscopical examination by scraping the aphthous patch with a scalpel, is a fungous growth probably analogous to the *mehl-thau*, mealdew, or mildew of corn. Ed. Martin, of Jena, who has devoted considerable attention to the origin of the *Oidium albicans*, infers that aphthæ in infants who depend on mealy nutriment is due to the introduction of the parasitic fungus with the food. As already stated, the origin of the monads, vibriones, spirilla, and denticola found in the mouth is also, like the others, from without, and they are introduced in the same way. They are like organisms found out of the body and bearing the same name, with the exception of the last. Ehrenberg described them as infusoria, and he asserted that "all true infusoria, even the smallest monads, are organized animal bodies." Monads, however, have been claimed by botanists and placed among volvocineæ, confervoid algæ, and, as already stated, a doubt has been thrown over the animal nature of the others. The movements of the *Vibrio spirilla*, or "trembling animalcules," assuming as they do a spiral form and winding their way through the fluid with rapidity, indicate apparently an animal character.

After careful and prolonged observation, with the exception of the *Protococcus dentalis*, I have yet to observe anything on the part of these organisms which I could regard as conclusive evidence that they exert any destructive influence upon the teeth. Their presence in a carious cavity is not proof positive that they were instrumental in effecting the decay, for they may have made it a place of habitat after the decay had been accomplished by other causes. The fact that these organisms can be found in great numbers in the mouths of persons whose teeth are perfectly sound is fatal to the theory that they exert a destructive influence.

In addition to the views referred to, it has been maintained by some writers that there are animal organisms in the oral cavity armed with formidable apparatus for boring into the enamel and dentine and effectually destroying the tooth-structure. It is claimed that the highest magnifying powers are required to see them. I had in my possession during the past year for some time, through the courtesy of Mr. Charles Stodder, a $\frac{1}{50}$th of an inch objective, made by Tolles, of Boston, with which I endeavored to find the boring apparatus, but was unsuccessful. This belief evidently had its origin in the fact that there are animal organisms known as stone-borers and wood-borers, which are very destructive in their attacks on stone and wood. Of these, the pholades, or stone-borers, scoop out their abodes in the calcareous rocks of the sea-shore.* "They have thin white shells, their valves being elegantly ornamented with projecting lamellæ or symmetrically arranged points. Their two ends are opened wide. From one projects the respiratory and nutritive tubes, which lengthen themselves out from the bottom of the cavity inhabited by the mollusk in order to pump up the sea-water with its myriads of animalcules; from the other, still more open, proceeds the foot, a thick, powerful, living sole, intended to play an important part in the life of the solitary animal." Some naturalists have fancied that the pholades are only a kind of living organism mechanically boring their habitations by rasping the rock with the aid of the sharp points on their shells. But this opinion is quite untenable, for before they could pierce the hard stones these delicate projections themselves would be completely worn away. A *chemical theory* held by some, that phosphorous acid is secreted by the mollusk, is untenable, because it would prove destructive to the calcareous shell of the animal, which would be dissolved long before the corroding agent could form a hole in the rock. "It is, however, clear that among the pholades living in the calcareous rocks the strongly-made foot undertakes the task in question. By its ceaseless movements this fleshy sole, little by little, wears away the rock which the water has softened. In fact, the rock, which is so hard in its dry state, is, on the contrary, very soft when the sea-water has saturated it, and rubbing it with the finger for a few minutes is enough to indent it deeply.

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* The Universe; or, the Infinitely Great and the Infinitely Little. By F. B. Pouchet, M.D. P. 80.

"But though the problem may be considered solved so far as regards the lithophagi,—that is to say, the eaters of stone, which live on soft limestone,—there seem to be some doubts as to those found in our most compact marbles, for it is evident that the movement of the foot would not suffice to pierce so unyielding a body. One of these marble-cutters has acquired a great celebrity in the annals of geology, from its having attacked the temple of Jupiter Serapis, situated on the border of the Mediterranean, and almost on a level with the waves. It is a modiolus,—*Modiola lithophaga*,—which has cut numerous excavations in the beautiful columns of this sanctuary, and has even gnawed them in an unsightly manner for the space of a meter (three feet three inches) at a height of six to seven feet above the fore-court. The temple is supposed to have been sunk in the sea by one of those movements of the land so common in volcanic countries; it was then attacked by the stone-eating mollusk, and afterwards raised by a contrary movement from the bosom of the waves. The labor of the mollusk and the double movement of the famous temple will perhaps long remain enveloped in mystery."

Of the *wood-borers*, the *Teredo navalis*, *Teredo palmulatus*, or sea-worm, make deadly havoc on dikes and ships, by constantly boring, gnawing, and hollowing out numerous tortuous galleries in wood submerged in the sea. The tool by which this is accomplished is the cutting edge of the little shell which is projected in front of the long and soft body of the animal, which you will observe in this beautiful specimen of the *Teredo palmulatus* presented to me by my friend Captain John Mortimer along with this portion of Oregon pine taken from a wharf in the bay of San Francisco. Notice how the wood has been cut by the animal so that it is completely honey-combed. The holes are as round and smooth as if a pod-auger had been used by a workman. The ravages of the teredo are terrible. In a short space of time they reduce the strongest beams to a state of fragile sponge. In 1731 these mollusks well-nigh occasioned the submersion of Holland by destroying the greatest part of the Zealand dikes. They attack the frame-work of the strongest ships, and long voyages in southern waters were formerly attended with great danger on account of their assaults. Many a noble vessel has foundered at sea through their operations. When a boy I had in my possession a portion of a plank that was much more honey-combed by the teredo than the Oregon pine here shown. It was taken from the ship Emma Matilda, commanded by my father, Captain Hugh McQuillen, and which he succeeded with great difficulty in getting into Havana in a sinking condition. The vessel when in port was examined, condemned as unseaworthy, and ordered to be broken up by the authorities, and was found to be completely riddled by the teredo.

In the absence of any other evidence, the destruction effected by the pholade, the teredo, and other stone- and wood borers, has, without doubt, led to the belief that the organisms found in the mouth were armed with formidable apparatus for cutting into the teeth. It is a singular fact, however, that, with the exception of a paper presented to the French Institute many years ago, and another published a short time after in this country, in which the writers claimed to have seen the apparatus referred to, no microscopist of any prominence has been able to find them, and it is therefore reasonable to infer that these writers, possessing eminently emotional natures, have drawn upon their imagination for their facts.

SUGGESTIONS ON THE PREMATURE EXTRACTION OF FIRST MOLARS.

BY DR. F. P. ABBOT, BERLIN.

(Read before the American Dental Society of Europe, at Hamburg bei Frankfurt, August 4th, 1875)

SINCE the introduction of knives and forks, the peculiar vocation of the cuspidatus has become a sinecure, and the first permanent molar may be fairly considered to be the most important tooth in the dental economy of the human race. I will not even except the superior incisors; in the present advanced state of prosthetic dentistry, I am convinced of the truth of the proposition, and for the following reasons:

First, these four teeth have the chief responsibility of mastication for the growing child from the time of their eruption, at five years of age, until the second molars and bicuspids relieve them of part of their duty, at twelve to fourteen years of age. During this period the child needs especially to be aided in its physical development; and what more conducive to health than well masticated food?

Again, it is important to avoid the suffering of the child from the decay of the teeth and their consequent extraction,—an operation frequently dreaded so much and so long as to seriously affect the health of highly sensitive natures.

Again, you are rarely able to predict a closing of space, caused by extracting the first molars, with any degree of certainty; and even if the bicuspids lean towards the second molars so as to show but little space, their masticating power is very materially diminished by their isolation.

In these days of railroads and steamboats and constant change of country, how do you know that your little patient, with its partly decayed first molars which might now be saved, may not be sojourning in some foreign land, when its second molars are being put together before it is sufficiently acclimated to enable it to assimilate the requisite quantity of lime-salts in its food required for a good dentine? My experience teaches me that the first molars of American children, half decayed and filled at home, are often more valuable than apparently healthy second molars formed in some parts of Europe. I have repeatedly seen the second molars hopelessly decayed before they were entirely erupted. I have also noticed that children brought up in the country and removing afterwards to the city have more density in the first molars and less in the second at that time, and the reverse will be found to be the case with city-bred children who inhabit the country in after-life.

This leads me to some practical suggestions in the art of preserving these important teeth.

If the mouth is healthy and the dentine sufficiently dense, there is no objection to filling with gold at once, provided the little patient can support the necessary fatigue and restraint. But how many cases present themselves to us where the tooth or the patient is too delicate to enable us to work practically with gold!

What then? I answer, use tin and gold, rolled together half and half; if too delicate for that, then use Hill's stopping, packed carefully in small pieces not larger than a grain of rice. After cutting hard margins to your cavity and saturating well with carbolic acid (you may even leave much of the decay in the body of the tooth), apply the Hill's stopping as hot as possible to the walls still moist with carbolic acid; and if you can hermetically seal up the decay, you need not fear its progress.

If you cannot use Hill's stopping, then use cotton and sandarac,—anything, so long as there is a shell hard enough to build an argument upon,—rather than extract a first molar before the second is erupted. If you cannot save the crown, cut it off and leave in the roots to prevent foreclosure of the alveolus.

But to return to tin and gold. I consider the two metals combined the *sine quâ non* of the dental office.

Some twelve years ago a friend showed me a tooth in his mouth, which he assured me was filled with tin and gold in England many years before. The tooth was well preserved, and I determined to experiment with the combined metals. At first I was very cautious, fearing galvanic action, which every one told me would inevitably ensue; but never finding any injurious effect resulting, I grew bolder, and soon learned that I could use tin and gold combined much nearer the pulp of a tooth without danger than I could gold alone, owing to gold being a good conductor and telegraphing every thermal change to the nearly-exposed pulp. Meanwhile, I wrote to many of my professional brethren, both at home and abroad, relating my experience with these metals, and urging them to give it a trial (but I have yet to learn that it has ever been fairly tried in America). Dr. Palmer, of Syracuse, seems to have noticed the innocence of this purest of all amalgams, but informs us that he has never made any further use of it. Here be it remarked that the word *amalgam* does not necessarily imply the presence of mercury. Our best men at home are discussing the advantages and disadvantages of every amalgam that was ever heard of, but they persistently refuse to try plain tin and gold. Many a tooth has been hammered to death with gold, or disfigured with amalgam, that might have been easily preserved had it been simply filled with tin and gold at the proper time. This material has the advantage of being much softer than soft gold-foil when introduced into the cavity, and leaves a masticating surface as hard and durable as the hardest gold. It can be consolidated by lateral pressure as soft foil, or by direct pressure as hard foil, or by both lateral and direct combined, as *neither* hard nor soft gold can. The tin is always rolled on the outside, and, oxidizing more or less, the plug becomes very hard and the decay arrested.

Now, why is there no perceptible galvanic action between these two metals? and why are thermal changes not communicated by a filling of tin and gold?

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

(Continued from page 533.)

THIRD DAY—*Morning Session.*

THE association was called to order at the usual hour, the president in the chair.

A motion was offered providing for the appointment of a committee to confer with a similar committee of the American Dental Convention in regard to a joint meeting next year at Philadelphia. Laid on the table.

On motion of Dr. J. H. Smith, a committee was appointed to draft appropriate resolutions in regard to the death of Dr. Hill, of Norwalk. Carried, and Drs. Smith, Abbott, and Harlan appointed.

The subject of "Dental Chemistry" was then taken up. This subject had been opened on the previous evening, before adjournment, by the reading of a report from the committee by Dr. H. A. Smith.

We give the following synopsis:

The report first alluded to a subject which had been investigated during the past year by Dr. S. B. Palmer, a member of the committee: viz., "Chemical and Galvanic Action upon Teeth and the Materials used in Filling." Dr. Palmer assumed that many cases of failure after careful filling are due to an electro-chemical decomposition of the tooth-bone, induced by a current set up between the tooth-bone and the filling material. He claims that caries is a result of chemical action, and that fillings merely prevent it by shutting out the fluids from the cavity. He believes that in some specific cases other materials than gold will be more effective in arresting this action. The circumstances which seem to give support to this view are, that the latent electricity contained in all matter is liable to be developed, under favorable conditions (as in a fluid of a certain character), into a current; and this effort to restore the equilibrium will result in a loss of both form and texture in one of the elements. Changing one of the elements in a battery for one of a higher order will cause a reversal of polarity; a change of the solution from acid to alkali also changes the polarity. Tooth-bone and filling materials stand in the following electrical order when tested by the galvanometer, with saliva for the fluid: gold, mercury, oxychloride, dentine, tin, amalgam. In weak acid the order is reversed in some of the elements, and gold and dentine stand at the extremes of the list, the latter becoming the positive element or element acted upon. Between the materials at the extremes of the list the greatest action will take place, and between those nearest each other the action will be least,—so slight, in fact, that a change of fluid, or even a change of temperature in the same fluid, will cause a reversal of the action. In an abnormal or porous condition of the tooth-bone, gold, by reason of its negative properties, supplies a decomposing current, while the lower grades of filling materials being more nearly upon the same plane of equilibrium with dentine, less action is produced and less breaking down of the tooth-structure. Tin not only arrests decay mechanically, but in frail, chalky structures acts as an antacid element, arresting the current. Gold is best in a well-organized tooth. Oxychloride, though nearly neutral as regards tooth-bone, is subject to chemical action itself, and hence not permanent. Amalgam stands higher in the scale, and, like gold, is liable to excite a chemical action. If there is not a perfect combination the mercury will be acted upon by the current induced by the finer element, and the effect of such action is visible in the fine pits which we see upon the surface and edges of the plug. Any attempt to make the amalgam finer is, therefore, a step in the wrong direction.

The report then touched upon the amalgam question as presented in the late papers of Drs. Hitchcock and Bogue. It was stated that while the physical properties of amalgam are of the greatest importance, yet the chemistry of amalgam must take precedence; for though we might obtain an article free from expansion or discoloration, yet if these compounds affect the system injuriously, the question of their use would be at once settled.

The experiments of Dr. Bogue were then alluded to, by which it was shown that three months of chemical test failed to materially diminish the weight of the test-plugs; and also that the fluids which contained the teeth and pellets, upon being tested for mercury, were found free from it. From these results Dr. Bogue had concluded that almost any amalgam, if used intelligently, could be employed without danger to the general health. The different conclusions reached by Drs. Palmer and Bogue indicate irreconcilable differences of opinion; but when opinions are based upon demonstrations and are free from prejudice, progress is being made, and ere long the question may be settled.

Prof. Cassidy, a member of the committee, also contributed some observations upon the subject of bleaching teeth. He reviewed the chemical agents which cause discoloration in decayed teeth; the precipitated sulphides, being mainly insoluble, are considered as a principal source of discoloration. The writer considered that teeth can in general be restored to a normal color; but caution is necessary in the use of bleaching agents, else they may affect the tooth-structure injuriously. The most successful treatment is found to be the application of chlorine gas, which is generated in a small retort or flask, by the action of hydrochloric acid upon the black oxide of manganese. Upon applying a gentle heat the chlorine will be developed, and may be conveyed to a receiver or bottle, from which it may be applied to the tooth by means of a straight glass tube some inches in length, one end of which is inserted in the cork of the bottle and the other is drawn to a fine point. Upon inverting the receiver the chlorine will pass downward into the tooth, which must be in a moist condition, as the gas will not bleach otherwise. It should be followed by the immediate use of an alkali, to neutralize any acid, and the mouth and nostrils should be well protected by the dam, to prevent the irritating effects of the gas when inhaled.

The subject being open for discussion,—

Dr. Palmer, of Syracuse, whose investigations had been referred to in the report, made some remarks with a view of further explaining his theory in regard to dental caries. There are, he said, two distinct divisions of teeth calling for our operations; and they call, in his opinion, for different methods of treatment. First, those which, though decayed, may be considered as in a normal condition as regards their structure. For such teeth the operation of filling is purely mechanical; we plug the cavity and exclude the moisture. The dentine is in a normal condition, and the gold, though of opposite electrical conditions, does no harm in contact with the bone. But there is another class of teeth which demands antiseptic treatment. For instance, the sixth-year molars, when soft and chalky; in these teeth gold is not only not the best, but it is positively injurious.

The speaker then went into a minute exposition of the principles of galvanism, as applied to the case in point. In the galvanic cell there are two elements, the higher and the lower. When gold and tooth-bone are brought in contact these elements are present, and the relations of the battery are sustained. The idea had been entertained that only metals would form such relations, or, in other words, act as conductors; but experiments had proved that tooth-bone was such a conductor. In firm teeth it is a non-conductor, but in soft, porous teeth it becomes a conductor, and the fillings become loosened. We can measure this action with the galvanometer. Tin possesses antiseptic properties which gold does not possess. Fletcher says it is the plasticity of the tin, but it is more than that. The tin stands in almost the same electrical relation as dentine, and, when submitted to the galvanic action spoken of, it is consumed, and not the dentine.

The two substances, tin and dentine, however, being so nearly of the same condition, there is very little galvanic action. Amalgam, to his surprise, he had found to stand nearer to gold than tin in this respect, when he supposed it would fall below. Any attempt to make it finer was a step in the wrong direction. He did not recommend amalgam; the cases are few in which it should be used, but when used it should be in accordance with chemical laws. If tin would stand abrasion it would be better in every case. When amalgam is used there cannot be a perfect union of the metals till after crystallization, and the mercury will remain around the edges, and will be dissolved out, and the edges will be ragged and the mass porous. The mass should correspond in electrical condition with the dentine. In some amalgams this seems to be almost attained.

He had had a case in which a partial gold plate had salivated a patient on account of the different electrical condition of the patient's mouth. He had boiled the plate in strong soda, to produce a different surface, and in a little time the system adjusted itself. This case was one of a thousand, as gold hardly ever affected a patient in that manner. It should be understood that the galvanic current does not destroy, but is only the evidence that chemical action is going on, the result of which must be destruction.

Dr. Taft inquired why it was that when a gold and amalgam filling are in close contact the dentine is apt to be destroyed around the gold.

Dr. Palmer said that it was because there was an alkaline current about the amalgam, but around the gold there was acidity. He could not say whether the chemical action produced the current or the current the chemical action. It did not matter, however, which preceded, for one follows the other on the wings of lightning.

Dr. Taft spoke of cases in which there was persistent pain when amalgam fillings were inserted, which continued till their removal, and asked why it was.

Dr. Palmer said that it was in consequence of a difference in electrical condition; amalgam was not proper in those cases, but gold was.

Dr. Chandler asked Dr. Palmer's opinion as to the plan recommended by Mr. Fletcher to overcome chemical action, viz.: to varnish the interior of the cavity with copal, to act as a non-conductor.

Dr. Palmer said that any varnish that would act as a non-conductor would answer the purpose; it fills the pores of undeveloped dentine.

Dr. Osmond. Decomposition around fillings occurs in an acid condition of the buccal fluids. The acids have an affinity for the phosphates of lime. The silver of the old-fashioned amalgams oxidized and combined with the tooth as does nitrate of silver. Amalgams containing a large proportion of tin do not discolor, and the shrinkage is less. He rarely uses amalgam, and is not defending it. He has seen many a good gold filling rendered useless by the proximity of amalgam. As Dr. Watt once said, "A thunder-mill has been erected in the patient's mouth!" Where mouths are very acid there is the most evil. In such cases he varnished the cavity with silicate of soda and touched it with sulphuric acid and water, washing out afterwards, which left a film of silicate, upon which he inserted the filling, and did so without pain. The cavity was protected, and there was no sensitiveness. He had found gratifying results from such treatment.

Dr. Taft said that he had been gratified at the remarks of Dr. Palmer; he does not go so far as he would like, nor so far as he will if he keeps on in the present course. We ought not to be satisfied with the investigations of Dr. Palmer and one or two others, but each ought to investigate for himself. Amalgam has not answered, and it is doubtful whether it will ever be so known as to be used with reasonable expectation of saving teeth. But if it or other materials are to be used, they should be as thoroughly understood as possible. It has been used in the dark by the great mass. The dental depot men had told him that since the papers of Drs. Hitchcock and Bogue on this subject they are selling largely-increased quantities of amalgam. Now, if these papers prove anything, it is that amalgam is unfit to fill teeth with. The direction in which Dr. Palmer had been investigating had not been touched upon at all in these experiments. These are *the* great questions in regard to it,—not whether it will contract or discolor, but its effect on the system, and the points which Dr. Palmer has been making. There is here a large and profitable field for investigation. Bleaching teeth is an important subject, and but little understood. We leave out of view the agent producing the discoloration; it is produced by various things. There is some change of color inevitable when the pulp is devitalized, especially in young teeth; there is a change in the soft-solid substances of the tooth. The larger the amount of this material the more difficult will it be to restore the color. In some cases excavation will be sufficient. What should be used will depend on what the coloring material is. Almost any agent thus far used will both fail and succeed. Chlorine is the great bleacher, and it will accomplish it so far as it can reach, but not farther. If the tooth is blackened through its substance, nothing will ever remove it. Mistakes are sometimes made in endeavoring to do this. In one case within the speaker's knowledge, after a long treatment with chloride of lime, the entire crown of the tooth came off.

Dr. Rehwinkel said that he was gratified at the remarks of Dr. Palmer, and thanked him for his experiments. This theory explained a great many things for which he had been able to find no satisfactory solution. Looking over his work, and knowing that he never fills without the greatest pains, he finds wear and tear; the filling is faultless, but the tooth has left the filling; the closest joint had been undermined. Fillings sometimes remained good for some years, and then there seemed to be set up a morbid chemical action which caused destruction. He believes the oxide of tin possesses a peculiar medicinal action upon tooth-bone, which enables it to resist decay. In children's teeth it is better than gold. His suspicions that the destruction he had observed depended upon causes over which we have no control had been confirmed by Dr. Palmer's remarks. The amalgam question should be handled carefully and with kid gloves. Dr. Bogue and others had shown us that amalgam must stand upon its own merits and not upon the maker's name. He hoped amalgam would never be raised to the dignity of discussion. To some it might be furnished free of charge in unlimited quantities, while it would not be safe to recommend it to others. If we ever undertake to discuss amalgam it will be a curse to the operative department, as rubber has been to the artificial. Still, he would sever his connection with a body which would forbid his using it; when he does so he wants to know why he does it. He looks with dread at the tendency which the question has taken, and sees a cloud rising in the horizon.

Dr. Hunter (Michigan) said that he is practicing in a small town of fifteen hundred inhabitants, where the people had been taught by traveling dentists that amalgam was as good as gold. They would work for half price, and tell people that it was only for looks that gold was used in front teeth. He had himself become disgusted with amalgam, and had put in but one filling of it since 1874; but some of his patients had left his office never to return because he would not use it. They could do work so much quicker too than he could, even with all the facilities for working rapidly, and they could do it without pain. He thought these difficulties which he encountered in a small place were well worthy the attention of the association.

Dr. Daboll spoke of a patient whom he had seen who had had teeth filled in Berlin. The appearance of the fillings attracted his attention, and on inquiry and investigation he had discovered that they were a combination of gold and tin. Since that time he had himself used this combination, and the result, as observed after two years, has been highly favorable.

The subject was then passed.

There being no report on the subject of "Dental Therapeutics," that of "Operative Dentistry" was taken up, and Dr. Stockton read the report of the committee, written by Dr. McCall and himself.

The following is the substance of the report:

Dr. McCall's report was confined entirely to the department of appliances. The burring-engine was spoken of somewhat at length, as standing at the head of the list. The Elliot suspension and S. S. White engines were considered as the leading styles, and the merits of each were spoken of. The attachments for injecting air and water were especially mentioned, together with the equipment of burs, disks, polishers, burnishers, etc., and the fear was expressed that many purchasers of engines did not avail themselves of these advantages, but were trying to get along with a scanty outfit.

Motive-powers were then considered; electricity, steam, springs, and water-power being named; the last being considered as having advantages over all the others for those having water in their offices.

The various mallets were then spoken of. The electric has its warm friends and staunch opposers. The S. S. White plugger for the engine was named as undoubtedly the best in its line, and, driven by the Backus motor, had been used by the writer for a year, and had proved a perfect success. The work has been easier for both operator and patients, and the latter express a decided preference for its use.

Minor appliances, such as Bancroft's and Hickman's rubber dam clamps, Jarvis's separators, Bogue's tape-forceps, and Magill's buckle, were briefly mentioned, and the report concluded with the caution that a few well-selected instruments would do better service than a multiplicity, which would load down the operating-stand and confuse the operator.

Dr. Stockton's report was upon the same branch of the subject, and was mainly devoted to the electro-magnetic mallet and the Backus water motor, both of which were spoken of in the highest terms. In regard to the former, it was stated that it had received the indorsement of Professors Truman, McQuillen, and Arthur, and Drs. Jack, Webb, and others, as second to no appliance save the rubber dam. One-half to two-thirds the time is saved by it; the most delicate walls are preserved, and every pulsation is under the will of the operator, who is greatly relieved from nervous and muscular exertion.

Three different forms of automatic pluggers—the Buckingham, Gaylord's pneumatic, and Swartley's—were very briefly noticed, and the report concluded with a somewhat enthusiastic mention of the Backus motor, as with its various uses best calculated of all the numerous appliances to preserve the health and prolong the life of the operator; in fact, with that and the rubber dam, and electric mallet, dentistry is made easy, and we would grow young again in its practice, and "return from our vacations with overflowing delights to its welcome embrace."

The subject being open for discussion,—

Dr. Taft said the report was a good one, but some caution must be exercised lest these new things run away with us. It seems as if all there was in operative dentistry in these days was to have something to bore with. This ought not to be. We should not attempt to do everything with the dental engine. Some do, and bore and grind more than they ought, and with far less precision than could be done by hand. This is more especially so with young men; they fail in delicacy and precision, and work as though the teeth were devoid of vitality. They need a caution, and a special caution. He would not have it understood that he does not like these appliances. While we improve the machines we should also improve our knowledge of the things on which efficient operations on teeth are based. We must know how to do the work, and the condition of the parts, and to control and manage that condition. We must not run wild on instruments and appliances, but value all things as they deserve.

Dr. Atkinson. Almost all teeth requiring filling have currents of circulation, which must be taken into account; and because they have not been, the pulps have died and the teeth must be bleached. Some poor conductor ought to be substituted for the lost dentine so far as possible. If we could use simply a stratum of gold plate at the periphery of the cavity, which would exclude all the air, it would be a perfect filling. Hill's stopping or oxychloride should be used; but if the latter, it should not be brought into contact with the pulp at all. He mixes the oxide of zinc with salicylic acid, and fills over it with the oxychloride.

Dr. Abbott. Young men should not use the engine at all till they have learned to do the work well without it. They should study the anatomy of the teeth and the distance they can cut. Thousands of teeth have been filled upon a live pulp, and it has died and they must be bleached. He does not believe that amalgam enters into the substance of the tooth at all; it is the semi-fluid substances in the tooth which discolor. He had never seen the water motor; the only thing seems to him to be the electric machine sold by S. S. White for running the engine. Had never used a solution of salicylic acid for capping pulps. Pulps may be preserved when oxychloride is in contact with them. Thermal changes are likely to cause the death of the pulp, to prevent which Hill's stopping is most successfully used; never fills without it if there is room to insert it. In root-canals takes a solution of gutta-percha in chloroform and carries it into the canals with a highly-polished instrument, places a piece of Hill's stopping over it, and forces it into the canals. Many canals it is not safe to enlarge; objects to the attempt to enlarge canals in general. Many teeth are ruined by drilling through.

Dr. McKellops said that it was not necessary to enlarge the canals; they could be filled with a solution of gutta-percha without it. He exhibited specimens showing how perfectly the solution would enter the canals. This was said to have been done twenty years ago, but he had never heard or read of it till it was brought forward by Dr. Bowman, of St. Louis. By wrapping a few fibers of cotton on a broach the solution could be carried into the canals, and by placing a piece of softened gutta-percha over it and applying pressure with a larger-pointed instrument the soft material would be forced very perfectly into the canals.

Dr. Rehwinkel. Is it possible that a tissue so delicate as a pulp will tolerate an agent so strong as chloride of zinc, an agent which is used to destroy tissue? How is this to be reconciled? How is it possible that it preserves here while it destroys elsewhere? Dr. Atkinson is more responsible than any other living man for any mischief that has as yet arisen from this treatment, and more harm has been done with it than with any other remedy that we have. Chloride of zinc is a sneaking assassin; it is not entitled to the respect due to the bold attack. If it does not kill, it is because the constitution is so strong as to successfully resist it. It mummifies and keep things quiet, and appears to be a brilliant success, but the pulp is most likely dead. The reports we hear are of only a few weeks' standing. We do not open and examine, and run the risk of injury. If it does not give trouble, we are justified in thinking it is alive. The condition of the pulp in exposure ought to govern us. We should not always douse with carbolic acid, not at all when freshly exposed. What is the use in cauterizing a wound which we wish to heal by first intention? There is no better substance for capping than gutta-percha in choloroform; if oxychloride is used, would cover the pulp with paper, cork, or something of the kind, and then would risk it. If the pulp is suppurating there is difficulty. These specimens of Dr. McKellops are the best thing he has seen. It has become necessary to defend the use of anything but gold in roots, but gold is not under all circumstances the best either for roots or teeth. When we cannot get out all the pulp, oxychloride may be used to mummify the rest.

Dr. Atkinson said he had been held responsible for the use of oxychloride of zinc, but he wished to announce that he is not responsible for men understanding through their elbows. It is a misunderstanding of plainly-stated truths. In the DENTAL COSMOS for March, 1868, *Atkinson's* method would be found. It is the same now, except that he uses salicylic acid, the active principle of creasote. He makes a pool of it over the exposure, makes a cream of oxychloride and drops it over it; this drives off the creasote, which is then absorbed, and a filling of stiffer oxychloride is put over it; cover either with gold or a pellicle of collodion. He is no assassin, except to error.

Dr. Rehwinkel said he had simply stated a fact; we know that Dr. Atkinson indorses this substance in immediate contact with the pulp.

Dr. Atkinson. I don't; what is immediate contact?

Dr. Rehwinkel (putting his arm around Dr. Atkinson's neck). Is not that immediate contact? (Laughter.)

Dr. Atkinson. That is the contact of your coat-sleeve.

Dr. Rehwinkel. Then the creasote represents the coat-sleeve, but the coat-sleeve is no fitter for contact than the other.

On motion, Dr. Morrison was invited to read a volunteer paper on "Operative Dentistry." The paper was devoted to the operation of replantation of teeth. The substance of it is as follows:

The writer stated that he had resorted to the operation several times, and proceeded to give a detailed history of several cases. The first was in the mouth of a delicate lady of forty; the tooth was badly decayed posteriorly, involving the pulp, and the roots covered with a brown, thin scale of tartar. The patient not being able to undergo the operation in the mouth, the tooth was extracted and filled, the tartar removed, and the tooth replaced. For three or four days some pain was suffered, but now, after five months, the tooth is the firmest in the arch, and the gum has a more perfect union than it had for years. Other cases were then detailed, in which the same general plan was pursued, the roots being filled with pure gold wire and the crowns with oxychloride and gold. Some of the cases were mentioned as questionable, or partial failures. One was in the mouth of Dr. Ingersoll, of Keokuk, Iowa,—a right lower first molar, which, having an enlarged root, broke in extraction, the posterior root separating, and one-eighth of an inch breaking off from the other root. The molar, or what remained of it, was converted into a bicuspid, filled and replaced, and is doing good service, except on the hardest kind of food.

The writer stated that he had replanted nineteen different teeth, of all classes, all pronounced worthless if treated in the mouth, and of that number only four had been extracted the second time. He took the ground that in all cases where the pulp is dead or beyond restoration to vitality, and in cases with incurable fistulas, the tooth can be more successfully treated and more of the organ saved, taking all risk of breaking into account, in this manner than in any other; and that though it might be carried to an extreme, yet a large number of teeth removed by accident or otherwise might be restored to usefulness by this method.

Dr. Morgan said that gentlemen seem to insist that death is the result of using oxychloride; he knows that this is not so. He is careful not to re-expose the pulp, but when he has done so he has found it living twelve months afterwards. Those specimens are pretty, but he fears that they are not practicable. Is not satisfied to fill roots with a plastic material; does not know what he is doing; you may pump a portion of the débris backward and you will drive the material out into the soft parts. In the use of oxychloride, there has been more than one case where it has been driven through and necessitated extraction. Any plastic material is liable to this.

Dr. Abbott. Pulps *are* saved with oxychloride in contact with the pulp,—that is, in contact with it except so far as the albumen may separate them. He had watched and recorded results, and out of seventeen had saved sixteen every time. In one case he had capped three teeth in this way, and filled with amalgam and afterwards with gold, and in doing so the cap flew off, and the pulp was alive and in perfect condition. It makes a great deal of difference how the pulps are handled. They must not be in an irritable condition; and if they are, they must be treated till they can be handled as well as any other wound. Gutta-percha and chloroform will not preserve teeth with him, nor will cork or paper; none of these are half so good as oxychloride.

Dr. ——. The coating of albumen is a capping of itself; it prevents the infiltration of fluids; it is just the thing.

Dr. Rawls, of Lexington, spoke of the use of lead wire for filling roots; formed as nearly to the shape as possible by first getting the size of the canal with a piece of cotton wrapped around a broach. It exerts a therapeutic influence in chronic inflammation. Oxychloride in contact with the pulp is not the thing in all cases. The action of the escharotic is to contract the pulp and push itself through. Is the carbolate of albumen soluble or not? If it is, it is either taken up or left *in situ;* and if the former, there must be a space left, which will result in strangulation against the ragged edges of the cavity. We need something that is not an escharotic, that is a good non-conductor, and that will resist the introduction of the permanent filling. This we have not got. Plaster of Paris would be good if it was durable enough. We must protect the pulp from the action of chloride of zinc. Sometimes there is a superabundance of life in the patient that can stand anything; but we do not often have such patients.

The hour fixed for the election of officers having arrived, the association proceeded to the election, with the following result:

President.—A. L. Northrop, New York.

First Vice-President.—H. J. McKellops, St. Louis.

Second Vice-President.—H. A. Smith, Cincinnati.

Corresponding Secretary.—J. H. McQuillen, Philadelphia.

Recording Secretary.—C. Stoddard Smith, Springfield, Ill.

Treasurer.—W. H. Goddard, Louisville.

Executive Committee.—New members: L. D. Shepard, Boston; T. L. Buckingham, Philadelphia; and M. H. Webb, Lancaster, Pa.

The action taken at the meeting held in 1872, at which it was voted to hold the meeting of the association in 1876 in Philadelphia, was taken up and ratified

The meeting then adjourned.

Evening Session.

The meeting was called to order at the usual time. The president, Dr. Dean, having left for Europe, the chair was occupied by the vice-president, Dr. Keely.

The subject of "Operative Dentistry" was still under discussion, and Dr. Rawls continued his remarks. He said that he considered Dr. Atkinson's method of applying oxychloride nearly correct, as he understood it. Dr. Rehwinkel's remarks were also in place as regards soft teeth. Few teeth will bear oxychloride in contact with the pulp even though carbolic acid is used first. If amalgam is applied over the capping it will almost certainly cause the death of the pulp. Bichloride of mercury is formed under the cap, unless the oxychloride is well dried out. Oxychloride is valuable for roots; introduces it with a few fibers of cotton, and it goes as near to the apex as any other material. Success in capping depends upon the diagnosis. When the pulp is exposed it is in one of three conditions,—either congested, inflamed, or dead. We must be able to see exactly the condition it is in. It is our duty to save a portion of the pulp alive if possible; it is often wholly destroyed when it should not be. Would cut down to healthy tissue and leave it, and there is thus a better chance for success.

Dr. C. R. Butler said that if we must practice by machinery, we might as well be machinists and have done with it. Patients don't like to have their mouths made a machine-shop of. The idea that there must be a machine for everything is unscientific. The ability to cut induces us to cut to too great an extent; this is the case especially with young operators,—they are in great danger of doing damage with the engine. The packing, too, must now be done with machinery. There have been more poor fillings put in during the last ten years by over-packing than by under-packing. Fillings are packed to death. (Applause.) The walls are powdered. They go away from the fillings, and they ought to, for there is no wall there. There is no chemistry about it,—it is miserable mechanics. Hard gold requires great force, and there is no tooth that will stand the continued concussion without becoming powdered. Machinery is doing damage even in the hands of the best men. They don't appreciate the amount of force they are applying. He does not argue in favor of any kind of operating, but we may be overdoing the matter, and are more likely to be with machinery. There is no advantage in mixing gold and tin; use either one or the other. The two metals will be likely to give rise to galvanic action. They say that in soft teeth it is more congenial, but if cavities are cut out well and well filled, no chemistry will hurt them. Many operators exhaust themselves by having so many appliances and making so many extra movements before they are ready to begin. He then spoke of the use of screws in cuspid teeth, illustrating his remarks by the aid of the blackboard.

Dr. Abbott. Amalgam fillings sometimes do good service, and many men would save some teeth better with that than with gold. Thousands had better use amalgam, or rather, gutta-percha. But he does not advocate the use of amalgam, and rarely uses it. But sometimes teeth can be saved better with it. Hammering gold against the walls is what produces these chemical changes; the walls are broken, perhaps imperceptibly, but the check grows larger. Is not a believer in screws; there is not a case in a thousand where a better filling cannot be made without them. The gold is apt to be loosely packed around them, and is liable, if packed hard, to knock the screws loose. Had never had any satisfactory results from their use, and had abandoned them long ago.

Dr. Flagg. It seemed as if, judging from the remarks he had listened to, he was back where he was twenty years ago. If this profession has not changed in that time, it shows that it rests upon a *firm basis!* It requires special skill to work oxychloride of zinc successfully; Dr. Rehwinkel can't work it because he has not the skill to do it, but he has skill to work gutta-percha, and that takes skill. It seemed that the day of "iodine and creasote," of thymol, and those ancient things had passed away. Now the only thing was salicylic acid. That is omega number three; and who could have had an omega number three but Dr. Atkinson? He (the speaker) had tried to save more teeth, he supposed, than any other man; he had tried everything, and had saved an everlasting lot of them, and an everlasting lot of them had died. He knew they were dead because he *smelt 'em.* If he thinks that a tooth should be filled with amalgam, he says so. Some plugs *will* fail, though put in as an Abbott or a Butler can put them in; that is, those upon approximal faces. Saving pulps depends upon the patient and upon the operator and largely upon the climatic location. He cannot say with Dr. Abbott that in his region, the miasmatic land between the rivers, he can save sixteen out of seventeen. He is almost afraid that he loses sixteen out of seventeen. He had formerly used equal parts of creasote and oil of cloves, but now bathes the bottom of the cavity with oil of cloves; it is not escharotic, and it has a sort of satisfying odor, and, by the way, it is very good for wasp-stings. Creasote almost always causes trouble in an irritable tooth; but there is no agent so soothing as oil of cloves. There is nothing better for the aching that sometimes occurs under the application of the dam. This was *his* omega number three.

The speaker made some protracted remarks on the subject of amalgams, though he did not know why they wanted to know about it if none of them used any of it. He is not one of the men that advocate doing good work without regard to price, and then charge seventy-five or one hundred dollars for a filling. A dental depot man had told him that he had sold one thousand ounces of amalgam to one man at one time, and it was not all used by the *poor* dentists either,—those who are not here. Amalgam is the best plastic filling known. The papers read at New York, about which so much had been said, were all bosh, bosh, though we were led to believe that that meeting was the culmination of all dental science. If he had not had special facilities for investigating this subject he would have taken them all for corn. The analyses were far from correct. When men say that fillings won't leak they say what they don't know. He has packed one thousand tubes, and in one tube the filling will leak and in another it will not. The packing is an important matter; if the tube is filled dry there will be no serious leakage, but they all leak some. But amalgam ought not to be washed; if it was, the tubes would leak in less than two minutes. He had tried washing in alcohol and also in water, and the difference was just nothing at all, though he had dried his hands and the mass with warm napkins. He would earnestly advise not to wash amalgam; it must be worked dry. If everything else is equal, the cavity that is most dry will succeed best. The alloys in market are all much alike, and it is not strange that men should be pleased with each. Pressure will not suffice to make a solid filling; it should be tapped lightly with burnishers. Don't lay it down on the table, but keep the button in your hand to keep it warm; don't squeeze the last piece hard, but wait till it solidifies, and wipe off the surplus mercury, if any. As to the matter of the drilling machines, he thought the young men could take care of themselves. It was strange how much solicitude was manifested in regard to the young men. He would say let them go on boring, *boring*, BORING! (Applause.)

The meeting then adjourned.

(To be continued.)

AMERICAN DENTAL CONVENTION.

(Continued from page 538.)

SECOND DAY—*Morning Session.*

THE convention was called to order by Dr. John Allen; the president, Prof. Coy, being indisposed.

The morning hours were devoted to a clinic, carried on by Dr. Bonwill, illustrating the use of his electro-magnetic mallet and diamond reamers. The operations showed a firm faith in the instruments on the part of the operator, and were witnessed by a large number of ladies and gentlemen, guests at the Ocean Hotel. The filling was completed in a comparatively brief period, it being claimed that by the use of the electric mallet a great saving of time was effected.

The committee appointed to express the sense of the convention on the death of Dr. Gage reported appropriate resolutions, which were unanimously adopted.

The secretary read a letter from Dr. Eastlacke, of Berlin, the foreign secretary of the convention, accompanying a speculum, or mouth-mirror, composed of metal (silver and lead), which the writer had had constructed in China, and which he presented to the convention.

It was acknowledged with a vote of thanks.

The subject of "Incidents of Office-Practice" was then taken up.

Dr. Stockton said he had been using salicylic acid in teeth which have a devitalized pulp. He packs the crystals into the roots and leaves them a week. By this method of treatment there is not so much danger of ulceration as by the ordinary method, even though particles of débris are forced through the root. In ulceration of the gums he had found no other remedy so effective, and had been astonished at the promptness with which it had cured cases of long standing. Uses a saturated solution in alcohol, adding rose-water to render it agreeable, till precipitation is nearly produced. He would call attention to MacMahon's preparation of iodine and aconite, which, according to Dr. Abbott, of New York, is wonderfully effective in cases where trouble follows filling.

The secretary read a communication from Dr. J. D. White, of Philadelphia, calling attention to the necessity which existed that something should be done to establish a standard of fitness or qualification in our profession. Other professions have regulations, and why should not we?

The communication was accompanied with specimens of teeth which had been extracted, and descriptions of the same, illustrating the quackery which is practiced by some operators; the special point being the desire on the part of operators to put off, and thus get rid of, patients after having performed a doubtful operation.

Dr. Ambler. This subject requires consideration, but the question is how to get at it. The code of ethics in this convention is the same as in the American Association. We cannot take official notice of these cases, as no names have been given. In such cases as those described only temporary fillings should be inserted. An operator who would send off a patient to suffer deserves condemnation.

Dr. Stockton, in response to a question, spoke of the law of the State of New Jersey, which was now in operation, and which prohibited any one from commencing practice without a diploma, unless he should pass an examination by a board of censors and receive a license from them. He represented that the board was doing its duty, and that the effect of the law was good.

In regard to the subject brought up by the letter of Dr. J. D. White, he spoke of a case of failure to extract a portion of the first molar. The operator said he could not extract without removing the second molar, and in attempting to do this the tuberosity was broken as far as the bicuspid. The patient was allowed to depart without treatment, and with the assurance that the jaw was not broken. The speaker had treated the case, making a plate to hold the broken piece in place.

Dr. Hurlburt, of Massachusetts, asked advice in regard to the method to be pursued in treating a case of irregularity in a patient twenty-two years of age, models of which he presented. He spoke of a method of making temporary plates, by making the rim of celluloid or rubber, which is over the teeth and under the lip, with a division immediately over the central incisors, and detached from the main plate for some distance each side of these teeth, say to the first bicuspids. By this means, when the gum shrinks, the ends of the rim can be bent back, so that the shrinkage can be partially overcome and the rim brought into contact with the gum.

Dr. Ambler presented an appliance in the shape of a pair of small forceps, with delicate, wedge-shaped points, shutting past each other, useful for pressing teeth apart for the purpose of examination or inserting wedges.

Dr. Winder then read a paper on the "Causes of Dental Diseases," of which the following is an abstract:

Discoveries in medicine looking to prevention of disease have been more successful than means of cure. Decay of the teeth in the United States is more extensive than elsewhere, and yearly becoming worse, and the subject is of vital importance. Dr. Knox, of France, has laid down the principle that where man has been transplanted from his natural habitat he suffers evil consequences, and cites the above fact as an evidence of deterioration of the white race here. If we had reliable statistics as to the teeth of the American Indian, it would throw much light upon the subject. If their teeth remain the same as when first discovered, it would strengthen this theory; but if they also have deteriorated, we must look beyond this change. We have no data on these points.

It has been stated that caries was unknown among the Indians until after the introduction of green tea, but we are without facts to substantiate this statement.

Tastes change with circumstances: roast beef in the tropics is repulsive, and tallow candles are eaten with gusto in the frozen regions. Different populations require different food-stuffs; and because certain articles are necessary in Europe, it does not follow that they are so in the United States. We must, therefore, follow nature's desires, as manifested in the taste. In the brutes this sense selects the best and discards the injurious. Common sense has taught us of late to follow this law. Change of diet, too, is recognized as necessary.

The essayist then offered a theory which he claimed as entirely new, so far as he was aware. He did not state it dogmatically, however, and was open to conviction. It was in opposition to the generally received ideas. All animals, he said, with a digestive apparatus at all similar to man's, rest and sleep immediately after a full meal. In the human infant this tendency is manifest; in the adult the craving for this is manifest. Horses, etc., are fed more lavishly at night than at other times. Lower down in animal life, we find absolute torpor after a meal. Hounds which are chased immediately after eating do not digest their food.

The causes inducing deterioration of the teeth are only operative during childhood, while the organs are forming. Teeth which lack the necessary structure are obliged to yield. In investigating the causes of this condition we must, therefore, go back to the management during the period of development. Disease in the mother during pregnancy affects the teeth. So long as the child, after birth, is allowed to follow the instincts of nature all is well. It feeds and sleeps *ad libitum.*

After teething begins, commences the system of starvation which is the real cause of want of proper dental development. Instead of giving the child strong food, which, if too strong, would be thrown up, it is fed upon mixtures of all conceivable kinds. A little later the child is sent to bed empty, or nearly so. The blood can only derive its constituents from the food, and if this is insufficient its function is wholly impaired. Who, in raising a fine horse, would pursue such a course? And what difference is there between a child and other animals? It is agreed that a full meal, before sleep, makes the child restless; but it is simply the sudden change of the contrary habit; and on this principle it might be argued that whisky was essential. It is only an artificial nature.

The child should be fed upon a wholesome diet, and his own tastes should govern the selection and amount. The tastes, however, may become depraved or corrupted; but, generally, what the palate demands in childhood is necessary and best. In support of these positions, we observe that the teeth of the upper classes, and in the city, are worse than among the poor, and in the country. In the last cases, children are fed on simple diet, and never go to sleep empty. Quite the contrary is the case in the city among the rich. Children are sent empty to bed, deprived of the influence of the sun, and of a pure atmosphere. In New England this process is pursued more persistently than elsewhere; pies and tea are substituted for more solid nutriment. In the South it is said that the negroes have the best teeth of the country; if so, we suppose that it is because they are fed before sleep. Europeans eat four meals a day, and as much for supper as at any other meal, as do also the laboring classes in this country; and among all these the teeth are rarely attacked by disease. No people feed as do the Americans, and none are so thoroughly defective in dental structure. Cold and hot baths are not in accordance with natural laws. No animals, unless amphibious, subject their young to it. These subjects require close investigation in all their branches. The two great questions are, How to prevent deterioration, and how to restore a diseased tooth to a normal condition.

Upon the reading of the paper being concluded, Dr. Donaldson, of Washington, said that, while he was not prepared to adopt the new theory fully, yet he felt sure that the members would agree that the paper was an able one, and its conclusions worthy of consideration and investigation by those enlightened enough to find out the causes of dental disease. Dr. Winder had said that he could only give the outline of causes; the details would demand a great amount of study and observation. Many able men had given much time to this subject, but each one by himself; and they first pick out a theory, and then arrange facts to demonstrate it. No theory, however, has been demonstrated, or presents a complete solution of the difficulty. He wished to say that an organized effort had been inaugurated by the dentists of Maryland and the District of Columbia, and they are now engaged in a systematic effort to discover causes of dental decay. In this effort they hoped to be able to enlist the aid of the Government of the United States in obtaining statistics as to the food-stuffs and the condition of the teeth of all nations capable of being reached. The labor required is not underrated; it may be years before great results are obtained; but we hope to have the aid of the whole profession, and many hands will make light work.

Dr. John Allen. The paper started right, but some of its points need strengthening. The system is built up of certain substances in certain proportions. The Creator has been careful to furnish these materials in due proportions. The brain requires phosphorized materials, the muscles sulphurized, the bones mineral ingredients. In the food provided by the Creator the due proportions of mineral as well as other ingredients are provided. We receive the phosphates and other ingredients, but the mineral is reduced in amount. We bolt and sift the flour, and change the proportions. We remove forty pounds of this bone-producing substance from every barrel of flour, and the result is deterioration. As a consequence, we pay the penalty. The fifteen thousand mills engaged in removing the mineral elements of the flour cause the loss of twenty million teeth in this country every year. Other nations, which do not change the proportions, keep their teeth to a good old age. The remedy is ours. If we would do any good, we must look at the cause and apply it. Teach our patients how to live so as to save the teeth. The higher classes of Europe, who bolt their flour, suffer as we do. The peasantry use coarse food, and their teeth are better. In the South the field-hands, who live on coarse food, have better teeth than the house-servants. It has been understood that when teeth are once formed there is no change going on in them, as in the soft tissues; but the speaker takes the ground that a change is all the time going on, and that waste and supply are not confined to the soft tissues. When a sufficient amount of mineral element is not taken in, decay comes on. A few individuals have done what they could, but no important action has been taken so that the attention of the public has been turned to the matter. By proper treatment, the teeth of families can be so changed that they do not require attention once in as many years as they formerly did in months. Instances of this are numerous in his practice, in which both himself and the patient are fully aware of the fact.

Dr. Jarvis congratulated the body on having this broad subject presented so ably for discussion. Leaving hereditary causes, and coming down subsequent to that point, we find two prominent things. First, lack of exercise. We do not use the organs enough, and they are consequently weak and shaky, and not capable of being used. The teeth are large enough and the bones are large enough, especially in children. Lime enough has been put there, but the animal portion has been changed. How shall we touch that portion? Exercise is necessary, that the functions of nutrition may be properly performed. He has observed this change taking place. A small opening in a sulcus will lead on and on, and you don't know where to stop, and cannot find the distinction between the dead and living portion. The second thing which is important to notice is filthiness. We can make the public realize more on these two points than on any others. He wants a crust, and the teeth cannot be healthy without it. The whole tendency is to neglect these things; everything is cooked soft, then soaked, and then washed down without chewing. The next state follows naturally; the teeth are daubed up, as the fingers would be in dough. This we can counteract to some extent by the use of brushes, thread, etc. How often we feel that we ought to say something to our patients pertaining to the period of gestation, but we do not, because it comes within the domain of the M.D.

Dr. John Allen. We take it for granted that the system furnishes the materials. This is a mistake; the system can appropriate, but not create. We might as well expect that oxygen can be converted into carbon as that insufficient food-materials can be converted into bones and teeth. Other countries do not show the deterioration of teeth that we do, and not one brush is used there to a million here.

Dr. Hunt. The paper contained a great deal of useful matter. Teeth, at a given age, were better in former years than those presented now. We must unite our efforts in investigating this matter, and in this manner we may succeed, if we can enlist the members of the profession in the work. The Creator has not only furnished the materials but has established laws, which, if we observe, we shall be healthy, but if we violate them we pay the penalty. No fact is more true than that the Lord is a jealous God, visiting the sins of the fathers upon the children unto the third and fourth generation. We must go back and find the original violation of the law, and then we can prescribe the remedy and not before. Both Drs. Jarvis and Allen were partly right, but neither went far enough. We cannot assign any one single cause for the trouble, nor tell how many causes there are for the decay of teeth. If you disturb the proper proportions of the ingredients in the human body you have disease. If we vary the proportions of oxygen and nitrogen we can produce five different chemical substances; if we add a third substance we greatly increase the number of combinations. We must look back into all the elements of supply that are needed, and furnish them all in abundance. We have eliminated the strength of that portion of the food needed to make bones; not all of it, but so much of the strength of it that, though we still have bones and teeth, we do not have good bones and good teeth. Part of the trouble is the want of proper materials, and part is that the machinery is not in order. Exercise for the teeth is as necessary as for any other portion of the body. The necessity for it seems to have been pointed out by the Creator. He puts the food before us, but the teeth must prepare it, and in doing so they benefit themselves, just as any member of the profession benefits himself while doing others good.

After recess, Dr. Stockton spoke of the Backus water motor for driving the engine, and recommended it as simple and efficient.

Dr. S. E. Arms then read a paper on "The Inter-Relations of Medicine and Dentistry," of which we give an abstract:

The physician stands related to the dentist as the father to the son, or the tree to its branches. Disease has engaged the attention of able and wise men, but not even the wisest physician is capable of treating and curing all forms in which it exists. Hence have arisen the various specialties, including dentistry. It is frequently asserted that a dentist need only be a good mechanic. This idea is being pretty well expelled from the minds of intelligent men in the profession and out of it. If a physician must be an educated man, it is equally important that the dentist should also be. Anatomy and medicine should be preceded by a thorough culture in his own language, and at least a respectable knowledge of the natural sciences. As to the classics, they are great helps, though they are not science. If we lived as long as Methuselah we might advantageously become thorough linguists. But, as things are, it is not necessary to go through college previous to studying dentistry. The knowledge, however, must be got. He had found that but few college graduates had any knowledge of the natural sciences, chemistry, or philosophy. It is complained that the standard of admission is too low in the medical colleges. It is more emphatically so in the dental institutions, to say nothing of private instructors. Chemistry, with its delicate manipulations, is a valuable aid to the education of the hands. The preparatory studies have been too much neglected; there must be a higher standard and a more thorough course before the community will recognize us. The dentist should have all the scientific and medical knowledge of the physician, and superadded to that a thorough knowledge of his own specialty. A knowledge of the circulation, and of the secretions, is essential, as well as of pathology. The secretions often contain a predominance of acid. He had instituted experiments by which he had ascertained that sugar did not act upon the teeth till fermentation takes place. In pearly teeth the rapid decay is due to two causes,—want of proper lime-salts and an acid condition of the fluids. The manner in which the acid condition is brought about cannot be stated definitely. It is found that the teeth of pregnant females are very subject to decay. They should use particular care at such times.

The periosteum is exceedingly liable to inflammation, and it is of the greatest importance that this subject should be understood, in order to successfully treat the disease. We know but little of its true nature, but its physical phenomena are well known. There are different stages and terminations. The periosteum becomes exceedingly painful when inflamed, there being little room for expansion. It is important that the dentist be able to discriminate and locate the seat and cause of pain. The real success of a physician depends upon his ability to correctly diagnose and to apply proper remedies. It is equally the case in dental practice. Both base their practice upon a knowledge of the system and the laws that govern it. Whether we should extract or not in a given case will depend upon the length of time the disease has existed and upon the constitution of the patient. If aged or enfeebled, the forceps should be applied; in the contrary condition, even apparently hopeless cases may be successfully treated. In mechanical dentistry, also, the highest degree of mechanical skill should be superadded to thorough scientific and medical knowledge.

This is rapidly becoming the sentiment of the enlightened portion of the community, on which our patronage chiefly depends; hence self-interest alone should prompt to a zealous prosecution of science.

In conclusion, the essayist referred to the great change that had taken place in the past forty years, when no information could be obtained from other dentists except under promise of secrecy and by paying for it liberally. He congratulated the younger members of the profession that they lived in this bright day, and counseled that "*Excelsior*" should still be the motto, as long as the brain could conceive or the hand render available a new thought for the relief of suffering.

Dr. Buckingham being present, was called on for some remarks. He expressed the opinion that this body would yet be the largest body of dentists in existence. It should, however, be an organized body. The profession is going onward and onward, and if this progress is continued a few years we shall be, if we are not already, better qualified than any other profession.

Dr. Ambler Tees then read a paper upon "Crystal Gold," of which the following is a synopsis:

Dr. Tees stated that he had addressed a letter to the manufacturer of Watt's crystal gold, inquiring as to the history of crystal gold. In reply, he had learned that in 1852, while Mr. Watt was lecturing in Western New York, on chemistry and electricity, he was asked by a dentist if it was possible to make a soft, porous, and compressible sponge gold. After some experiment, it was produced by dissolving it in mercury, and afterwards removing the mercury with nitric acid. It was found that the temperature must be kept down to or below 60° during the whole period, in order to produce uniform results. Many experiments were made before the gold which we now have was presented to us. The manufacturer thinks it best always to anneal to redness, on a sheet of platina-foil, before using. If the cohesive property of foil had not been discovered, no doubt crystal gold would now have been the favorite gold with the best operators.

The essayist then quoted from an article from the pen of Dr. Arthur, in 1854, on this substance, in which he spoke of it as a great advance. A quotation from Dr. J. D. White, of the same date, was also made, which spoke of it as a failure in his hands. It had not proved, as was claimed, capable of welding itself to the tooth, and his business had been increased by it, because he had been compelled to do his work twice!

The essayist said that he had used many ounces of crystal gold, especially in approximal surfaces, and had been encouraged in doing so by finding the fillings compare favorably with those of foil. The most beautiful results can be obtained by the average dentist. As much care should be used in the preparation of the cavity as for foil, with proper retaining points. The cake of gold is divided by means of a sharp razor; by this means the mutilation of the crystals is avoided.

The instruments used are selected from Dr. Ellis's set, preferring those with flat points. Other instruments, of various forms, are also used. Moisture must be excluded by rubber dam. The gold should not be annealed if it works satisfactorily, but otherwise it may be heated. The electro-magnetic plugger is a valuable auxiliary in the use of this gold, especially in large cavities, the blows being uniform and more rapid; the only objection being the noise, which, it is hoped, will be remedied.

Mr. A. J. Watt then gave a most interesting exhibition of crystal gold under the microscope. The appearance was magnificent, the feathery crystals standing out in wondrous beauty which passed the power of description. A vote of thanks was passed to Mr. Watt for his exhibition.

Dr. Perrine said that, while he was glad to see the older men here, he would be glad also to see the younger. He knew what the convention had done, and he knew it was not yet out of the mire. He hoped that the officers for the ensuing year would be selected from the South, so as to draw from that deserted section. Young men are the leading ones, and in Europe different institutions are creditably represented by young gentlemen from this country.

Dr. Hunt, of Washington, then read a paper upon "Celluloid," of which the following is an abstract:

Dr. Hunt's paper opened with an allusion to the progress of civilization, from the primitive condition of our ancestors to its present advanced status, and stated that that progress had taken place in obedience to natural laws, which show themselves both in their observance and violation. The latter is followed by penalties, among which is found disease in general, including that of the dental organs. The right remedy is not always found at first. Thus, extraction was at first the only remedy for toothache. Our profession will not reach maturity until it is able to point out a means of prevention of dental disease. Till then we can only use our best efforts to repair; and when we fail, we can only replace the natural organs in the most artistic manner possible. For this purpose celluloid, though a comparatively new material, is rapidly and deservedly growing into favor.

The essayist then proceeded to give the chemical composition of celluloid. It is a form of cellulose, of which the cell-walls of various woods and vegetables are composed. It is treated as when it is made into pulp for paper, and then subjected to the action of nitric acid. Gum camphor is then added, and mechanically mixed with it. Under heat and pressure a chemical combination takes place. Gum camphor is a softener and not a solvent of cellulose, as has been stated. The camphor is partially expelled by continued heat. There is little plasticity in the material unless combined with camphor, which deprives it of elasticity and gives it plasticity. When thus treated it is not liable to undergo change of shape in use. It has a delicate texture, and requires coaxing rather than force.

The methods of moulding the blanks furnished us are the oil, hot water, steam, glycerin, and dry heat processes. The first four are baths for the celluloid, to avoid danger from explosion. The dry heat process, however, has been shown to be quite as free from danger as any, except hot water, and, perhaps, steam. Any of the processes will secure a fit of the plate except hot water, 212° not being a sufficient heat. The necessary evaporation of camphor will not take place so rapidly in a bath as in dry heat.

For making the casts let care be taken to use plaster that will set hard. The casts should be well rubbed with pulverized soap-stone to prevent the celluloid adhering to them.

In moulding, these points must be kept in view:

1st. To complete the moulding before too much camphor is driven off; 2d, to shape it while so soft that it will go where desired; and, 3d, to keep the plate under pressure and exposed to heat till its plasticity is exchanged for elasticity.

For finishing, use cones of felt, or cork covered with cloth. Powdered pumice, emery, or corundum, mixed with molasses, cut rapidly, and the powder will not fly; and for polishing, the material used should be first mixed in the same way. At the last, the pressure on the plate should be light and delicate. The finished plate presents a closer approximation to the natural tissues than any other substance. It is less harsh than a metallic plate, or even than vulcanite, is stronger, tougher, and more elastic, and free from injurious effects upon the mouth. It is to be hoped that the material will be improved, and that any imperfections it may possess will be remedied.

Dr. Allen said that researches for suitable materials for dental plates have been made in the animal, vegetable, and mineral kingdoms. In the animal kingdom, walrus-bone, horn, etc., had been used, but found to deteriorate in the mouth. In the vegetable kingdom, rubber, cotton, flax, etc., had been used. Platinum has no superior; it is very soft, —too soft without being stiffened. Continuous gum is nearer perfection than any other method of inserting artificial teeth. It is incorruptible and truthful, and will ultimately command the attention and ambition of the best practitioners,—those who do the best for their patients. Twenty years' practical experience has enabled us to overcome difficulties. It is true that there are more difficulties encountered and more time and skill required in this method than in others, but why should we spare the pains? It requires time and skill to convert the mulberry leaf into satin, but a rich reward awaits him whose labors are crowned with success.

Dr. Hunt said that he was not aware that in presenting his views upon celluloid he was treading upon the toes of the presiding officer (Dr. Allen); but he did not wish to modify his statements, for he thought we should have opinions of our own.

Dr. Ambler said that Dr. Allen knew he was right, and would lose no occasion to stand up for continuous gum; and we are glad of it, and so is the profession throughout the world. It is the best of all work, and the profession owes Dr. Allen a debt of gratitude for his experiments that they will never be able to repay. He moved the appointment of a committee to consider the propriety of making a suitable testimonial to Dr. Allen.

Carried, and Drs. Coy, Hunt, Tees, Reynolds, and Hurlbut appointed.

Dr. Allen said he had not the slightest idea of any such movement. He returned thanks for the confidence shown, and said it had been slow work introducing continuous gum, because rubber came out immediately after, and seemed to take the lead because any one could work it. The material had been indorsed by the American Institute. Every award for artificial teeth that had been made for seven years had been for this material to the speaker. In France it had received a magnificent reward, and at Vienna nothing came anywhere near it. One of five principal awards had come to the speaker.

Dr. Goble said he had used celluloid for a year with the best of results. He gave hot water the preference, and had yet to find the first misfitting plate. He has made it very speedily, and makes it thin and light, and has never seen a plate warped. If we must use a cheap base, is much in favor of celluloid. Continuous gum is the finest work made. He used to think it too heavy, and his patients thought the same; but by his present method of construction he could do away with considerable of the weight. He used a thinner plate (36 gauge) and a simple wire extending around, instead of backings, which made it as strong or stronger than the other way. The more he uses it, the more he likes this method.

Dr. Hunt. The last speaker's experience with celluloid had been different from that in Washington. He may have had hotter water (!), but that is scarcely possible. He (the speaker) had not intended to say that celluloid was better than continuous gum. The hot-air apparatus is preferable to oil or steam. With it a union of different pieces can be produced. Another advantage is that you do not have to stand over the piece and watch it so closely while being moulded. It can be left, if necessary, without danger of becoming porous. It is denser and firmer made in this way than when made with steam : the camphor is more completely driven off. The heat is lower, but the time consumed is greater.

Adjourned.

(To be continued.)

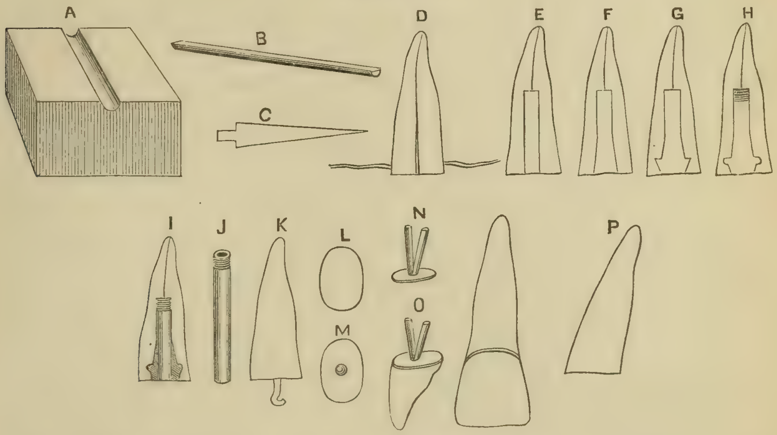
PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

The first meeting of this association since the summer vacation convened on Tuesday evening, September 14th, the president, Dr. Spencer Roberts, in the chair. A full attendance of members evinced interest in the proceedings.

After the transaction of regular business, Dr. E. R. Pettit presented the following communication from Dr. Theo. F. Chupein, of Charleston, S. C.:

I saw in the report of the proceedings of the Association of the Alumni of the Pennsylvania College of Dental Surgery that the subject of attaching artificial crowns to natural roots was discussed. Although I have seen cases in which the old-style wooden-pivot tooth had been in service for very many years, yet I cannot indorse that style of work as the best, for it is not applicable in all cases, and, however nicely done, invariably collects food and becomes offensive. With your permission I will give the manner in which I pivot teeth, gleaned from various plans and suggestions. I make my pivot wire as follows: In a piece of steel, A, I file a half-round groove, and polish smooth. I screw this in my bench-vise, and, taking a piece of round gold wire, hammer it in this groove until it is half round, B, generally making a piece about six inches long. I cut it in half and solder the two ends, laying the flat parts together. I then draw it through a wire plate until it is the size the pivot should be. I next make my gold tube; taking an ordinary piece of gold plate and bending it around a piece of wire and drawing it through the wire plate. To prevent the end of the plate which is seized by the plyers becoming marred, I take a piece of brass or copper wire and file it down, C, slip the shoulder into the gold tube, and solder. By this plan I can draw down the tube without marring it in the least. When the tube has been reduced so that the pivot wire fits in snugly, I solder it at the edges.

FIG. 1.



The next thing is the preparation of the root. I put on the rubber dam, as at D, then bore out the root, as at E, filling the apex with gold. The root is bored of the size to admit the gold tube already spoken of. I bell out the lower part with a cone bur, as at F. With an inverted cone bur I produce an undercut or shoulder, as at G; now with a hatchet excavator pressed up against this shoulder I make a groove all around it. This part of the operation can be still better performed by using a wheel bur on the burring engine, going all around the shoulder and making the undercut. The next thing is to tap the root, as seen at H. When this is done I cut a thread on the tube, as at J, and with a file cut nicks on the tube or make it rough. The next part of the operation is to cut the tube off of the proper length and screw it into the root. The tube has to be about one-eighth of an inch longer than is necessary, so as to have a part to hold on by in screwing it into the root. I use a pair of very flat straight extracting forceps for this purpose. When screwed into place, the space between the tube and root is filled with gold, after which all are filed down even to the gum ready to receive the artificial crown, I. The next thing to be done is to take an impression. Into the gold tube in the root, I put a piece of wire that just fits it loosely and is bent at the lower part, as at K. The object of this is that, when the impression is taken with plaster and the plaster sets, this bent part permits the pivot or wire to be withdrawn with the impression. Another impression is taken of the root *without the wire.* Models are made from these impressions;

the former to work by, the latter for the purpose of making a zinc die and lead counter-die. On the latter a thin gold plate is swaged, as L, which exactly fits the root. On the convex part of this plate is placed a minute bit of wax in the neighborhood of where the hole is to be. I now oil the model made from the first impression and press this little plate on it. The wax on the plate will be forced into the hole, left in this model, by the wire used at K, and serves to show exactly where the hole in this plate is to be punched for the reception of the pivot, as at M. When this is done, place the plate on this working model, and put in two pieces of the half-round wire; secure this to the plate and remove. When done, I mix a little whiting and water, and paint that part of the wire with it above the plate, so that in soldering the solder will not flow down and unite the two pieces; then invest in plaster and sand and solder. When finished, I have a plate with the pivot soldered to it, as at N. The final part of the operation is to select and adjust a plate tooth to this root, and, after backing it, it is united to the plate, N, and soldered, as at O. The object of the half-round wire is now apparent. These pieces are burnished so as to make them springy when they are slightly spread apart, and just before putting the tooth in they are squeezed together and pushed into the tube in the root. The tendency you see is to keep the tooth always tight and in place.

I have used the square box of gold spoken of by Dr. Barker. It is much more difficult to make this than it is to make the tube. There is never any accumulation under a tooth inserted as I have described, so that it is always sweet and clean. Whether the root be straight or inclined, as at P, the plan is of equal service, which is not the case with the wooden pivot. Should the tooth break at any time, the plate is readily removed and a new tooth soldered to it.

I do not approve of the plan of filling a root with Hill's stopping, and inserting a crown with metallic pivot by heating the same and holding in place until cold. It has no strength, and makes a botched job.

The plan I have described takes time, and one ought to get twenty-five dollars for it. I believe any one who could afford it would pay this for a nice, strong, substantial job such as it makes.

The communication was discussed as follows:

Prof. Buckingham mentioned that he now has under treatment the root of a bicuspid that he intends pivoting. The root being flat, a flat wire will be used for a pivot, and set with oxychloride of zinc. He has pivoted teeth in a manner similar to that suggested by the paper, but as it takes so much time, the operation is one that does not pay. He has also set plate teeth, and extended the stay around the tooth so that it will resemble a gold filling.

Dr. W. H. Trueman recommended inserting a little cotton, merely a few fibers, between the jaws of the pivot, to assist in spreading them apart and holding the crown firmly in position. When drilling and tapping the root, he uses a little soap and water on the instrument, which very much reduces the strain upon the root.

If the dentist could purchase the gold tubes already tapped, accompanied with the proper instruments for forming the thread in the root, much of the time and the most annoying part of the labor would be saved. With the appliances usually at hand in the laboratory, cutting a good clear thread on a gold tube without bending or crushing it is a very difficult task. The thread usually met with in tap-plates is not suitable, being both too fine and too shallow to hold well. A thread somewhat approaching that used for wood screws would be far better. For tapping the root we require taps that *cut*, and should have several to follow each other, so as to secure a good sharp thread without straining the root. The root, in position in the mouth, behaves very much like soft coarse-grain wood. Unless the tap is sharp and cuts freely, the threads crumble and break.

Dr. E. H. Neall said that there has undoubtedly been great advancement made in the last ten years in the manner of pivoting teeth, yet he believes that little improvement has been made, so far as durability is concerned, over the old method of wood pivots. The plan mentioned in the communication requires very minute work, and is expensive. The objection to pivot teeth has been that, no matter how closely fitted the porcelain crown may be to the root, the fluids of the mouth would enter and soon, by decomposition, gives rise to unpleasant taste and smell. This can be avoided in a great measure by covering the crown with a thin layer of Hill's stopping; then, after warming over a spirit-lamp, forcing into place. If there is the slightest excess, it should be trimmed away with a sharp instrument. When the root is in a healthy condition and will admit of considerable enlargement of the pulp-canal, the gold tube should always be used as a casing for the pivot, as it protects the root from injury from the expansion of the pivot. Has inserted but few pivot teeth for several years, but these have given considerable satisfaction.

Prof. Buckingham usually uses wooden pivots; compressing the wood to make it round. Has used tubes and exercised great care in their preparation, and in some instances, where inflammation set in, the work was to be done over.

In good healthy roots all this trouble may be justifiable. In former times many more roots were pivoted than now,—then it was customary to drive the pivot in with a hammer; this, together with the fact of the pivot being too tight, usually gave rise to trouble. More recently he has forced them up sufficiently tight with the handle of a plugger, notched for the purpose. Uses thin oxychloride of zinc, as it fills all interstices in the root, and also places some, mixed more thickly, between the root and the crown. Has also used Hill's stopping, and, in some instances, amalgam. In one case where the root was badly decayed, filled it with amalgam and then put in a silver pivot. In another case where the teeth were extremely short by reason of defective development, used a cross-pin tooth, and had to grind it down until the pins were exposed; this, of course, weakened it, and it broke. Finally, made a tooth entirely of gold, and, by reason of its unusually small size, it shows much less than do many fillings. This has now been in use some six years, and is doing good service. The offensiveness spoken of frequently comes from around the roots as well as from between the root and the crown. He recently extracted seven pivot teeth from one mouth, and some of them had been worn about twenty years. In many instances pivot teeth may be used, thus avoiding the necessity for a plate.

Dr. Wert uses very few pivot teeth. Is willing to do these expensive operations, but patients are not liberal enough to pay for them. In making a pivot he drills through hickory-wood, and inserts in it a gold wire, and it answers better than anything else that he knows of. Has known them prepared in this way to last for years. To prevent odor, uses Hill's stopping in preference to oxychloride of zinc, as the latter will crumble.

A communication was received from Dr. T. F. Chupein, of Charleston, South Carolina, accompanied by a plaster model of the lower jaw of a patient aged seventy years.

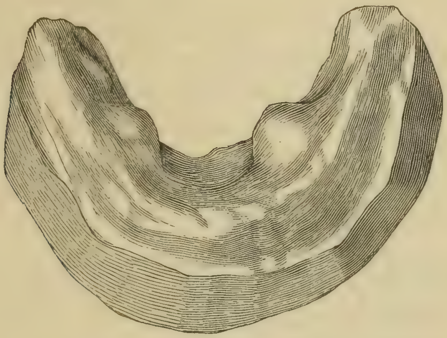
For ten years past she has suffered intensely from facial neuralgia, and had submitted, contrary to Dr. Chupein's advice, to the extraction of all of her lower teeth in the hope of obtaining relief from her sufferings. · She had called recently upon Dr. Chupein, complaining of pain in the sockets of the extracted teeth, but he could find no cause for the pain. He noticed, however, as will be seen by the cut, three protuberances on the lingual surface of the alveolar border, occupying the position of the first bicuspids and first molar. The gum covering them is healthy, and no pain is produced when pressure is made upon them. The doctor asked for the views of the members upon the case.

Discussion ensued, as follows:

Prof. Buckingham has seen one or two similar cases, and has attributed them to exostosis of the bone. The pain is nothing unusual. Has a case where there have been no teeth for twenty years, and yet there is sometimes pain. It may come from pressure upon the nerve. Although it is possible, does not think these lumps are caused by unerupted teeth.

Dr. Wm. H. Trueman suggested that the trouble might be caused by the branch from the dental nerve supplying one of the teeth becoming implicated in the cicatrix after the extraction, or some injury

FIG. 2.



to the nerve during the operation. In either case the pain might not immediately follow the operation, but might develop some weeks after, or be excited by a cold or some systemic derangement, and the connection between cause and effect thus pass unnoticed. Such cases, when long standing, are difficult to treat, as the long-continued irritation is very apt to cause a morbid condition of the nerve far beyond the point of injury; and this is sometimes the reason why operations for the relief of this class of cases fail. Exostosis, such as is exhibited by the cast, is rarely attended with pain. He had met with several cases of bony tumors, one of them quite prominent and slowly increasing, forcing the teeth out of position and interfering with the tongue so much that an operation will probably be required; but it has not caused the slightest pain. It is very difficult to diagnose a case like this,—it may perhaps be best approached by a process of exclusion, after a careful study of its history.

It may be well to remember facial neuralgia may exist entirely independent of local cause; and local predisposition may be excited by distant irritation or general disturbance of the nervous system. Relief may sometimes be obtained by the local application of such drugs as iodine, aconite, camphor, chloroform, belladonna, opium, etc.; separately or combined, they are often more efficient in the form of liniment. Hot soothing fomentations or counter-irritants are sometimes useful when the attack is unusually severe. At the same time, due attention should be paid to the general health, and recourse had to such tonics as quinine, strychnia, nux vomica, etc., when needed. Fresh air, sunshine, judicious exercise, and regular rest are often the best tonics. The behavior of the disease under treatment will often assist its diagnosis. The speaker then called attention to and exhibited a root having upon the apex what appeared to him to be the ossified sac of an alveolar abscess.

The following has been received since the meeting, from Prof. Buckingham:

From the description Dr. Chupein gives of the enlargements of the lower maxilla in the case he reports, I would pronounce them to be exostoses, or they might possibly be cartilaginous tumors. If they were salivary calculi or tumors in the soft tissues, they would be movable. But as exostosis is oftener met with in such cases, we would look for it first, and as these enlargements usually cause very little trouble, except to the dentist when he has to insert artificial teeth, the best treatment is to let them alone. If I attempted any other treatment I would try iodine first, and the best preparation of it that I have used is—iodine, ʒi; iodide of potassium, ʒi; glycerin, ʒii; this makes a solution that may be kept any length of time.

The pain that is mentioned in connection with the case may be caused by the cicatrix, as has been stated in discussing the case, or it may be from a gouty or rheumatic condition of the patient, or exostosis pressing upon the nerve, or, if artificial teeth are worn, they may press upon the nerve as it passes out of the mental foramen. In cases where there has been great absorption of the alveolus in the lower jaw, the mental foramen is nearly in the top of the ridge, and a plate of an under set of teeth may press on it so as to cause pain. I have had several cases of this kind, and some of them have caused me a great deal of trouble. In cases where the pain is produced by a cicatrix or exostosis, a surgical operation would have to be performed. Dr. Gross, of this city, has in several cases trepanned the lower jaw and taken out a portion of the nerve, but I cannot say how successful the operation has been.

In cases where the pain arises from constitutional causes, the treatment must be also constitutional.

JOSEPH PETTIT, *Secretary.*

CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

THE second annual meeting of the Central Pennsylvania Dental Association was held in Altoona, July 21st and 22d, 1875. The meeting was called to order by the president, Dr. E. J. Greene, of Huntingdon. After the usual routine business was transacted, the following subjects were taken up and discussed:

1st, "Gold Foil, Adhesive and Non-Adhesive;" 2d, "Amalgam;" 3d, "Rubber dam;" 4th, "Prices."

After holding five sessions, the following officers were elected to serve the following year:

President.—Dr. E. J. Greene.
Vice-President.—Dr. J. C. M. Hamilton.
Secretary.—Dr. W. B. Miller.
Corresponding Secretary.—Dr. H. W. Buchanan.
Treasurer.—J. W. Isenberg.

The subjects chosen for discussion at our next semi-annual meeting, which will be held at Huntingdon in January, 1876, are:

1st, "Dental Education;" 2d, "Articulation, and Shade of Artificial Teeth;" 3d, "Treatment of Exposed Pulps;" 4th, "Care of Children's Teeth."

J. W. ISENBERG, *Secretary.*

NORTH CAROLINA STATE DENTAL ASSOCIATION.

PURSUANT to notice, there was a meeting of dentists at Beaufort, North Carolina, on the 11th of August last, having as its object the formation of a State dental society. The meeting was well attended, and organized in due form under the name of the "North Carolina State Dental Association." A good constitution, by-laws, and code of ethics were adopted.

It was manifest that there is a purpose to do better, and it is believed that in future the dentists of the State will be fully alive to the value of professional intercourse. Steps were taken to induce legislation in behalf of the dentists of the State.

Officers for the ensuing year:

President.—Dr. B. F. Arrington.
First Vice-President.—V. E. Turner.
Second Vice-President.—J. W. Hunter.
Treasurer.—S. S. Everitt.
Secretary.—E. L. Hunter.

The meeting adjourned to meet the second Tuesday in August, 1876, at Greensboro', N. C.

E. L. HUNTER, *Secretary.*

EAST TENNESSEE DENTAL ASSOCIATION.

THE ninth annual meeting of this association was held in the parlor of the Lamar House, Knoxville, Tennessee, September 15th, 1875; Dr. S. M. Protho presiding.

The president delivered the annual address. Subject, "Professional Excellency."

Dr. W. H. Cooke, Cleveland, Tennessee, read a history of the treatment of a very interesting case of oral surgery.

The following were elected officers for the ensuing year:

President.—S. M. Protho, Chattanooga, Tennessee.
Vice-President.—J. D. Morgan, Smith's Cross-Roads, Tennessee.
Secretary and Treasurer.—S. B. Cooke, Sweetwater, Tennessee.
Corresponding Secretary.—W. H. Cooke, Cleveland, Tennessee.

The association adjourned to meet in Chattanooga, Tennessee, third Wednesday in September, 1876.

S. B. COOKE, *Secretary.*

BROOKLYN DENTAL SOCIETY.

THE annual meeting of this society was held on Monday evening, October 11th, 1875, at which the following officers were elected for the ensuing year:

President.—Wm. H. Atkinson.
Vice-President.—A. H. Brockway.
Recording Secretary.—C. P. Crandell.
Corresponding Secretary.—Wm. Fishbough.
Treasurer.—F. W. Dolbeare.
Librarian.—O. E. Hill.

C. P. CRANDELL, *Rec. Sec'y.*

OBITUARY.

DR. EVERETT A. SHAILER.

WE regret to announce the death of Dr. EVERETT A. SHAILER, of Deep River, Connecticut, a graduate of the Philadelphia Dental College, session 1873–74. During his attendance upon lectures he gave marked evidence of intelligence and skill as a practitioner. He had been engaged in practice some time prior to entering the institution. After graduating with honor he returned to his home and entered upon his work with earnestness and devotion to his chosen profession.

His health, however, gradually gave way, and about the last of May he had an attack of typhoid fever, which settled upon an overtaxed brain. He was confined to his room only two weeks, and died at his father's residence, in Essex, on the 12th of June, 1875, at the age of twenty-eight years. He leaves a wife and two children and a host of friends to mourn his early death. J. H. McQ.

EDITORIAL.

THE DENTAL COLLEGES.

WE present the following list of the dental colleges of this country, with the names and addresses of the deans:

BALTIMORE COLLEGE OF DENTAL SURGERY.—F. J. S. Gorgas, Dean, 259 N. Eutaw St., Baltimore, Md.

OHIO COLLEGE OF DENTAL SURGERY.—J. Taft, Dean, 117 W. Fourth St., Cincinnati, Ohio.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.—E. Wildman, Dean, 1205 Arch St., Philadelphia, Pa.

PHILADELPHIA DENTAL COLLEGE.—J. H. McQuillen, Dean, 2100 Arch St., Philadelphia, Pa.

NEW YORK COLLEGE OF DENTISTRY.—Frank Abbott, Dean, 12 West Nineteenth St., New York, N. Y.

NEW ORLEANS DENTAL COLLEGE.—A. F. McLain, Dean, Box 2714, New Orleans, Louisiana.

DENTAL DEPARTMENT, HARVARD UNIVERSITY.—Thos. H. Chandler, Dean, 222 Tremont St., Boston, Mass.

BOSTON DENTAL COLLEGE.—J. A. Follett, Dean, 219 Shawmut Ave., Boston, Mass.

MARYLAND DENTAL COLLEGE.—R. B. Winder, Dean, 140 Park Ave., Baltimore, Md.

MISSOURI DENTAL COLLEGE.—W. H. Eames, Dean, 1224 Washington Avenue, St. Louis, Mo.

DENTAL COLLEGE OF THE UNIVERSITY OF MICHIGAN.—J. Taft, Dean, Ann Arbor, Mich., and 117 W. Fourth St., Cincinnati, Ohio.

DENTAL DEPARTMENT OF THE UNIVERSITY OF CALIFORNIA.—A. A. O'Neil, Dean, 650 Washington St., San Francisco, Cal.

BIBLIOGRAPHICAL.

TWO THOUSAND YEARS AFTER; OR, A TALK IN A CEMETERY. By JOHN DARBY. Claxton, Remsen & Haffelfinger. Philadelphia: 1876. Pp. 106. $1.00.

This new volume, from the pen of the author of "Odd Hours of a Physician," discusses the highest topics to which the attention of human beings may be invited,—man: what he is, what he has been, and what he may be.

The dialogistic form has been adopted to introduce, as by an addendum, a continuation of the famous controversy of Socrates with his friends on the immortality of the soul. The following extract from the "argument" shows concisely the conclusions of the author:

"In these pages it is recognized that the positivist is right in maintaining that man is an automaton, and in the declaration that mind is a function of the brain, living and dying with that mass of matter in which it has its existence. It is also held that the organization of man demonstrates his ability to live without a soul; that a soul is not a necessity to man, and that he may be born, may live and die, without the immortal principle. It is finally attempted to be shown that man is the only offspring of creation to whom has been given the capability of receiving and holding the immortal principle, and that the extent and character of his immortality depend upon himself. What this principle is, the analysis exhibits."

We commend the book as a teacher of the art of thinking.

HINTS AND QUERIES.

WHAT is the cause of the dark line or fissure on the lingual side of celluloid plates, about opposite the outer edge of the air-chamber? And how can it be remedied?—DAVID MARSHALL.

WILL not some observing gentleman give us a list of the States in which legislative action has been had in reference to the practice of dentistry, with a condensed statement of the salient points?—H.

How can I avoid the difficulty of odontalgia sometimes attendant on the treating of pulps with nerve paste? Have noticed this trouble with pulps where there has been no previous aching. Is it the result of congestion, and to be treated as such? It is at times difficult to tell when a pulp is congested, hence above trouble. —Z.

EARLY ERUPTION OF THE WISDOM-TEETH.—During the present month a young lady, sixteen years of age, born in this country, of German parents, called upon me for professional advice. I found all the *dens sapientiæ* in position,—a rather precocious development.—O. U.

SANDARAC VARNISH IN HEMORRHAGE AFTER EXTRACTION.—August 8th, was called to see Benjamin G., twenty hours after extraction. Found him suffering severe hemorrhage and weak from loss of blood. Removed clot and filled the socket with a pledget of cotton saturated with sandarac varnish; placed a compress above and bandage over the head. All hemorrhage at once ceased. Bandage and compress removed at the end of four hours.

I report this case, advocating the use of sandarac varnish in hemorrhage from extracting, rather than that class of styptics that cause erosion of the teeth.—F. G. EDDY, D.M.D.

A CASE IN PRACTICE.—Patient, young lady; age, sixteen; of average health. Filled first right lower molar anterior approximal cavity with gold. Prepared cavity as follows: decay, white; removed with excavator all that could be done in that way; next used burr-drills by hand. Cervical wall of cavity left without undercut; outer edge well beveled; buccal and lingual walls of cavity so formed as to be retentive and no more; edges well beveled; work all done from masticating surface. Used No. 3 gold, annealed just before using; both small and large points used in condensing; the lightest blow that can be given with Snow & Lewis's improved automatic plugger; six grains of gold used. Six months after above operation was completed, had occasion to make another filling in same mouth. Examined above tooth, and found both lingual and buccal walls softening, without discoloration; removed filling at once; found cervical wall unchanged;

excavated thoroughly, and refilled with *os-artificiel*. At the end of three months examined, and found no change had taken place in the tooth ; removed *os-artificiel* and refilled with gold. Examined again at the end of eight months, and found both lingual and buccal walls of cavity softening as before; removed gold, excavated, and refilled with *os-artificiel*. At the end of six months found no decay in the tooth; refilled again with gold. At the end of ten months found the tooth decaying again ; again removed the gold and filled with *os-artificiel;* third and last gold filling taking about twelve grains of gold. In all this time no change has taken place in the cervical wall of the cavity as first formed, and no change in any part while carrying the *os-artificiel*. In my opinion pressure is the cause of all this absorption or decay. The condensing of the filling makes a wedge of it, and the tooth not being sufficiently strong to bear that force, absorption or decay is the result. The above is only one of three in the same mouth. As a tin, gutta-percha, or soft foil filling would not be retained, I have no remedy to offer. Would like to hear suggestions.—S. MUSSELMAN, *Brantford*, *Ontario*.

BASE PLATES.—In order to use up my old wax I have tried several methods of making it into sheets for base plates, but the best and easiest plan I have tried is as follows:

First, make a slab by pouring plaster into a common platter and allowing it to harden. It is easily removed, and you have a very smooth, hard slab, almost as good as marble.

Melt the clarified wax, and, taking the slab by one end, hold it over the wax basin, and, with a large spoon, pour the wax on to the smooth side of the slab until it is covered and of the required thickness, then immerse in cold water and remove the sheet, which can be trimmed and cut into small plates for use.

In this way one can make his own wax sheets, and use the same wax as often as he wishes. If the slab is of good size, in half an hour I can make a hundred. A little balsam fir may be added to toughen the wax ; about a teaspoonful to two or three ounces of wax.—J. H. S.

"VERNON GALBRAY, OR THE EMPIRIC. THE HISTORY OF A QUACK DENTIST."—A pamphlet of some one hundred and fifty pages has recently appeared in London under the above title. In the preface it is declared that

"An endeavor to expose the disgraceful frauds practiced on the public by the horde of charlatans who call themselves dentists is the aim of this little book." And that "the author has deemed it advisable to embody the subject in a short story."

The story begins by describing the residence and business and habits of one "Samuel Levi Moses, clock and watchmaker, of Rotterdam," who, having picked up a clever mechanic, with little wit, speedily extends his trade by "making and repairing *Artificial Teeth*;" after awhile, coming into possession of some capital through his wife, this Moses conceives the idea of removing to London. In propounding his scheme to his wife he says,—

"Notting is to be made here by clock repairing, and very little if I should give it up and become wholly a dentist. But in England—in London—I feel convinced, with the capital I shall have at command, a fortune is waiting for me. I have only to carry out the scheme I have matured, and riches—riches, wife, are ours !"

The details of removal to London, purchase of a fashionable house, in which a deceased dentist had resided, careful furnishing of the same, are briefly narrated; and then came the important task of fixing on a name.

"I must have a name that vill sound vell, and look vell, too. It must appear at the head of advertisements, on cards and announcements. It must be seen at street corners and in public places, in music halls and at railway stations. In short, that name must become a household vord, and Samuel Levi Moses vould never do at all."

Vernon Galbray was at last selected, and inscribed on the door. Then we have the matter of obtaining suitable assistants. A dental assistant was soon procured; but the literary work of compiling the advertisements, writing certain paragraphs, and securing for the same prominent insertion in the best newspapers, required a genius not so easily found. At length, however, such a one appeared in the person of a broken-down medical student, who is engaged and installed as *Secretary.* A rather spicy revelation of the way these public prints are worked, much like a piece of machinery in the hands of those who can supply the golden oil, follows; the method of employing decoys, in the person of his wife and three or four paid touters, is also racily told.

"What a delightful man Mr. Galbray is!" paid visitor number one would remark.

"Yes, indeed; and very clever too, I should think."—Number two.

"One of the most skillful operators in London, or he should not attend to me." —Number three.

An interview with the proprietor of a livery establishment, during which a brougham, a pair-horse carriage, and a traveling carriage are engaged to arrive and stand at the door on certain days and hours, leads on to the audacious trick of taking as an apprentice the son of a country clergyman, with a premium of five hundred pounds.

At a dinner-party composed of kindred spirits we have some disclosures of the dishonest practices which characterize the dealings of the quack fraternity.

One Lady Luff, who desires a set of teeth unknown to her husband, is informed that her case is an extremely difficult one, and will cost one hundred guineas; then she is persuaded of the necessity of having a second set. When delivered (by an assistant), the cash is paid, but no receipt given. In a day or two the quack calls, and on learning that the cash had been handed to his emissary, appears to be greatly agitated, pacing the room, and saying, "I have just discovered my assistant to be a rogue; he has been robbing me right and left, and I have every reason to believe he has run away with your money." The only remedy is for the lady to go with the quack to a magistrate and prove having paid the money; or—but of course he does not suggest that—she may get out of it by paying over again. Rather than be exposed she consents to this, and so is fleeced of four hundred guineas.

A great deal of padding, that would hardly do credit to a fourth- or fifth-rate novel, fills up the pamphlet. And as the story concludes, one wonders almost why it should have been written; but on glancing through a short appendix, and particularly at a certain paragraph slyly inserted at the very end, all our astonishment ceases; for this pamphlet, which *professedly* aims at exposing quackery, turns out to be itself a very cunningly-devised advertisement of a well-known dental depot.

There is an old proverb that says, "Set a thief to catch a thief." In this case we might alter the terms, and we shall understand how all the minute details of the Israelitish style of doing business come to be so faithfully portrayed. If any one of your readers would like to pay a quarter of a dollar for a novelty in the way of a dental depot advertisement, we recommend them to send for "Vernon Galbray."—W.

THE

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ORIGINAL COMMUNICATIONS.

DENTAL PATHOLOGY AND THERAPEUTICS.

BY J. FOSTER FLAGG, D.D.S.,

FORMERLY PROFESSOR OF DENTAL PATHOLOGY AND THERAPEUTICS IN PHILADELPHIA DENTAL COLLEGE.

(Continued from page 565.)

[Entered according to act of Congress, in the year 1873, by J. Foster Flagg, D.D.S., in the Office of the Librarian of Congress at Washington.]

IT must be distinctly understood that in the present consideration of leaving softened dentine within deep-seated cavities of decay, I am not discussing this practice as that *last resort* which it might be considered in cases of almost completely exposed pulps, but that it is being treated of in connection only with such cavities as, containing walls of comparatively soft tooth-structure, would have a large, thick mass of dentine, of horny consistency, between the absolutely disintegrated remains of decayed tissue and the vital and, at most, only slightly irritated pulp beneath.

It is in these cavities that the so-called "thorough" excavating of all the softened dentine would, unquestionably, if careful experiments are worthy of reliance, leave such a tooth in far worse condition than from the progress of disease it need necessarily be placed.

So far from there being danger of continued decay from the retained half-decomposed dentine, that tissue, in that condition, is probably the very best substance which could be put in apposition with the healthy dentine covering the pulp.

So far from its presence being antagonistic to the welfare of the tooth, it is eminently calculated to add much to the certainty of the ultimate preservation of its integrity.

So far from its removal being a necessity, I regard its maintenance as of the utmost importance.

But here again I feel it to be my duty to protest against any medicinal interference with the efforts of nature. The object gained by leaving this horny dentine is twofold: first, the prevention of exposure, or even of undue approach to the dental pulp; and second, the possession of a matrix in which, being protected, the efforts of the pulp may eventuate in reproducing that consolidation of dentine which had been diminished during the progress of caries.

While the former of these considerations is one of immediate recognition, its value is much, if not entirely, dependent upon the possibility of the latter; for the more complete the restoration to health of the remaining softened tissue, the more perfect the protection to the inclosed pulp.

Therefore, in cases where it is practicable the tooth to be excavated should be secured from moisture, by the adaptation of the rubber dam, *immediately after* the preliminary breaking down of the edges of the cavity and the washing out of the more easily removed portions of decayed material, food, etc., with tepid water.

Then it is that the cavity may be thoroughly dried, and the edges and external walls properly prepared, when, if the fluids of the mouth be markedly acid, or the progress of decay exceedingly rapid, it is well to test for acidity in the remaining softened dentine by means of a small piece of litmus paper.

Should such be found to exist notably, it should be neutralized by the introduction of a portion of a drop of solution of ammonia from the end of a blunt probe, or the dusting of the cavity with precipitated chalk or bicarbonate of soda, which, after a few moments, may be blown or wiped out.

Should pain supervene during the progress of the operation, and should it arise from acidity, the application of any of these alkalies will usually afford relief, though as dryness is a frequent provocative of pain in teeth containing deep-seated cavities of decay, the fluid ammonia is generally the better assuager.

In cavities which present no decidedly acid complication, but in which pain ensues merely as the result of drying, a slight application of the oil of cloves, as has been directed when upon sensitive dentine, will afford immediate relief, and, as it is neither escharotic nor powerfully antiseptic, like creasote or carbolic acid, it will not in the least interfere with the complete restoration of the moistened dentine to a normal condition; but, as I have said, where neither acidity nor pain demands the employment of any remedy for relief, I cannot deprecate too strongly the saturating of the softened tissue with creasote or other powerful medicament, under the vague impression that some beneficial result is thereby attained.

After a proper preparation of the cavity has been accomplished, it is sometimes, though rarely, found that the diseased dentine is too sensitive to admit of that pressure which is necessary to the impacting of a foil filling.

In such case, should it be deemed advisable to employ either gold or tin-foil, the adaptation of a small piece of metal plate is a most complete preventive to irritation.

It is not unusual, even in these tender teeth, that a thin covering of gutta-percha will meet every indication, particularly with a little care in regard to pressure in the introduction and compacting of the first portions of the foil. I would, however, recommend that the gutta-percha be placed in the cavity warm, as for ordinarily filling with that material, and that the sticky adhesion, due to heat, be obtained between it and the dentine.

By this means we not only attain the desired object of a protection from pressure, but, as I have before stated, also place our best known barrier against the further progress of decay in the event of any future partial failure of the foil-filling, or unfortunate fracture of the walls of the present cavity, either of which occurrences is by no means improbable in connection with teeth which have semi-decomposed dentine of horny consistency as a large component of the contents of their cavities of decay.

If, however, it is regarded as advisable, on the score of solidity of base, that a small piece of metal plate should be introduced, it is desirable that this should be made adherent, particularly in upper teeth.

Various means have been suggested for the accomplishment of this purpose. Gutta-percha dissolved in chloroform or benzine, and, as a varnish, placed in sufficient quantity upon the little plate to cause it to adhere when in position, is an excellent device.

Many adhesive materials, such as a mixture of wax and resin, pitch, shellac, etc., have also been used with satisfaction, some claiming for them even the advantage to be derived from a soothing and healing medicament in addition to the simple quality of adhesion.

Practically, however, I have found Prof. Arthur's combination of sheet gutta-percha and metal-plate the best and most satisfactory appliance which I have ever used.

Preparing and fitting a piece of gold plate, I place it upon the slab of the gutta-percha warmer; when it has acquired the requisite degree of warmth, a small portion of the heated gutta-percha is placed upon it, and naturally adheres to it with great tenacity; by means of a fine probe it is then taken up by the little ball of gutta-percha and readily placed in position, when, with gentle pressure from a plugging instrument, an accurate adaptation is made.

It is, however, oftentimes not alone the softened dentine in the bottom of the cavity which demands our consideration; for the walls themselves are recognized as deficient in strength both from the attenuation consequent upon decay, and the physical characteristics dependent upon defective structure.

It is in this condition that we find the so-called oxychloride of zinc a material of great utility, for with this, the undercuts can be readily filled without any detrimental pressure, and, by the hardening of the compound, much greater strength of surroundings is given for the purpose of thoroughly impacting a foil filling.

It must not be supposed that the practice I have advocated will result in universal success, although I can most certainly claim for it all that can be desired in a vast majority of cases; and yet, among patients of nervo-lymphatic and bilio-lymphatic temperaments, to which classes these teeth *mostly* belong, if systemic conditions tend markedly toward adynamic complications, and particularly if these are found in connection with nervous irritability, and all this with evident necessity for further constant drain upon the already exhausted vitality, it is hardly reasonable to expect that a recuperative supply of power will be afforded the pulp of a tooth which has already so signally evidenced a predisposition to decay, even though *all* external irritants are precluded from further action.

The same deficiency of force which permitted such rapid inroad upon the integrity of the organ nourished, will be found still existent, and sooner or later, generally within one, two, or three months, indications of the failure of the effort which has been made for the thorough conservation of the tooth will become apparent from the symptoms of uneasiness; slight but increasing responsiveness to cold applications; *gradual establishment of responsiveness to heat;* occasional pain, sometimes amounting to decided toothache; gradually increasing annoyance; sometimes *neuralgic* complication working backward and down the neck if from a lower tooth, and upward, over the eye, and *into* the ear if from a superior molar or bicuspid, and below the eye and in the cheek if from a superior cuspid or incisor, with no pain at first upon pressure; some tenderness upon striking the tooth with an instrument, due to concussion and not to peridental irritation; no sensation of elongation of the tooth; uneasiness and pain, intermittent or remittent, according to degree of aggravation, *but not periodic;* sometimes continuing without sufficient amount of discomfort to demand interference, until a quiet death of the pulp ensues; and sometimes inducing a degree of irritation which culminates in severe toothache, imperatively calling for relief.

It is most frequently the case, in these intense demonstrations, that we will find acute response to both hot and cold, inducing a paroxysm of odontalgia; that the tooth will be tender upon pressure, from a degree of irritation of pulp sufficient to have induced determination of blood with its *concomitant* hyperæsthesia, outside the apicial foramen; that occasional violent pain will present without apparent cause, and that all this trouble is positively located.

These are the usual diagnostics of a dying pulp, but these outspoken symptoms are frequently so masked as to render it exceedingly difficult to determine the presence of this cause of suffering.

It is to this fact that many cases of facial and other neuralgias dependent upon pulp-irritation are not recognized as due to that cause, for it is not infrequent that a degree of irritation exists which is just sufficient to induce congestion of a part of the bulbous portion of a dental pulp. Concomitant with this congestion we find a loss of sensation in the external portion of the organ, which precludes any response to applications of heat and cold. There is yet no congestion intense enough to cause any change of color (reddish) in the tooth; there is insufficient extent of irritation to induce that outside deviation from normality which shall be announced by pressure, or even striking upon the tooth; and yet, *making no sign*, portion after portion of that pulp will die, possibly with hundreds of severe, it may be with *intolerably intense*, paroxysms of "neuralgic" pain.

The patient is unaware of the existence of any dental trouble; the general practitioner is utterly unqualified to give even a respectable *guess* as to the origin of the malady *he* is called upon to treat, and, I think, experience has sufficiently proven that, at this point, the diagnostic skill of a majority of our own profession is weighed in the balance and found wanting.

Having reached a point at which we have found *liable* an irritation of the dental pulp, we will, before entering more fully into the considerations pertaining to the existence of this condition, and before discussing more fully other complications which most usually pertain to a still deeper progress of caries, give as a summary:

Causes of Irritation in Deep-Seated Caries.

1st. Vitally, by irritating and escharotic applications.
2d. Mechanically, by excavating.
3d. By pressure, the result of plugging.
4th. By conduction or other irritation after plugging.

Remedies.

1st. Judicious applications and proper protection.

2d. Care, and accurate knowledge of the location of pulp-cavities.

3d. By lateral pressure; judicious impacting of foil; the interposition of a solid base; or the employment of plastic filling material.

4th. Interposition of non-conducting or porous intermediate material.

(To be continued.)

THE EVOLUTION OF FOOD AS INDUCING THE SUBVERSION OF MASTICATION.

BY A. H. THOMPSON, D.D.S., TOPEKA, KANSAS.

THE food of man has undergone alterations and changes in accordance with the general law of the development of all things from simplicity to complexity, and has been evolved and elaborated into a condition of complicated refinement by the universal process of gradual unfolding. And although it has, to a great extent, retained its primitive nature (and origin, *i.e.*, the vegetable and animal kingdoms), and the difference between contemporary and primitive food is one rather of degree of preparation than of kind of substance employed, the distinction is incontrovertible and precludes question. The troglodytic man ate his food in the condition in which nature supplied it, and it necessarily required thorough and laborious mastication. Mechanical trituration formed a more important item in the process of his digestion than with civilized man, his food being coarser and less nutritious. The flesh of wild animals is more solid and contains fewer juices than that of domesticated animals, and requires greater powers of mastication, and the contemporary fauna of primeval man, which was much coarser in structure, formed his principal diet (man being by descent a carnivorous animal). The same may, to an allowable extent, be said of his vegetable food. Very gradually he began to reduce his foods, first by fire and then by mechanical means, which greatly lessened the labor of mastication. The growth of the reducing methods has, however, been less rapid than would at first seem from the efficiency of the means employed. From those remote beginnings the development of the art of preparing food has very gradually progressed to the height at which we see it to-day, slowly evolving higher types of food and gradually lessening the demands upon the function of mastication.

The mechanical and chemical modes of reduction have contributed jointly to the evolution of food, but the former has probably been the most active and fruitful of results as we see them, for the principal reason that it has assumed a more scientific character in its operations, in the application of scientific and theoretical methods. But the development of chemical reduction has been confined almost entirely to the empiricism of the kitchen, and is so far unscientific and unprogressive. And until science assumes control of this important department of domestic art, the results must remain as they have been, in arrears of ordinary progress. But while these methods are comparatively meagre as agents, their effects in the reduction of the mechanical resistance of natural foods have been most marked, and this softening is causing the precipitation of mastication into disuse. In the progress of the transformation of foods, mastication being less and less required has been less and less supplied, and in consequence is undergoing suppression. The law of economy of growth is omniprevalent in organic nature, and when an organ or a function fails of the necessary stimulus of constant use, it must of necessity, through the slow transit through countless generations, undergo modification in accordance with this law. And with the function of mastication it is patent that disuse is operating in a conspicuous manner; that the requirements are becoming obliterated in the process of the evolution of food, and mastication is being withdrawn. The development of the reduction of food having been slow, the progress of the suppression of mastication has been correspondingly slow, and is scarcely appreciable except by comparison with the most savage contemporary peoples, or with what we know of troglodytic man. Yet the progress that has been made since the primitive age of the race is evidenced as being considerable.

The tendency to the abolition of mastication, the lessening of its powers, brings with it two principal anticipatory actions on the part of nature; viz., (1) the anatomical mechanism necessary to its perfect performance is gradually reduced in compliance with the law of economy of growth when organs fall into disuse, the actual capacity being thus diminished; and (2) the ganglionic disinclination or want of susceptibility to excitation to effort. These react upon the foods in their further reduction, this again reacts upon the animal organism, the two forces being thus reactive *ad infinitum*, with the effect of the mutual reduction of the function and of its subject, of mastica*tor* and masti-ca*tee*: *i.e.*, the softening of food necessitates less mastication; less mastication reduces the capacity for the functional duty, and induces disinclination to the effort; these cause a further softening of food, and this again affects capacity and inclination with its reactive effects. Thus the mutual effect of mutual reduction is reflected and re-reflected, and has operated through the slow centuries.

The reduction of food has been further accelerated by the evolution of refined appetites and the development of the sense of taste to its present exalted susceptibility. This element has had weighty influence in the elaboration of food, and has contributed immensely to the evolution of higher types. Coarseness has, by its dictates, been almost banished. Mechanical reduction has been scientifically developed to a wonderful refinement in processes and results, and chemical elaboration has been placed upon a scientific basis, with a prospect of ultimate control of the methods of preparing food. While in many instances of products the influence of taste has been guilty of prostitution of its powers, in the majority of results its effects have been to eliminate all that is coarse and primitive, and to refine in quality the nutritious residue. It has aided in subverting mechanical resistance and in promoting digestive solution and assimilation.

Within a few years a new factor in the evolution of food has appeared upon the field, that bids fair to revolutionize the methods of its production; viz., the *chemical manufacture* of foods. This is but the natural result of the intrusion of science into all the domains of life, and in this department is but the sequence of that which has preceded in order of development. It promises to invade and ultimately to control the kitchen of the future, whose vestibule shall be the laboratory of the manufacturing chemist; and for physiological and economic reasons we hail the day! We witness the results and the potency of the influence to be exercised in the few examples of prepared food that science has produced, and cannot but expect great things in the immediate future, and ultimately a complete revolution in the sources of food-supply and its increase in quantity and quality.

The separation and reproduction of the elements of organic nature is to the chemistry of the day but a simple thing; but to that science of the future will be equally simple the production of the proximate elements of organic from inorganic nature, as has indeed been already done in a few instances. To this manufacture of the proximate elements from organic and inorganic nature we must look for the food-supply of the future, which must be immense in quantity and refined in quality. The rapid strides of synthetic chemistry seem to point towards the inevitable accomplishment of the *desideratum*, and with its consummation will come the era of artificial cheap foods and the utter disuse of mastication.

We expect such results, such services from science, for economic reasons. The age demands more and cheaper foods for its multiplying millions, and the capacity of the food-producing art must be augmented. Increasing intelligence, increasing population, and longevity of the individual and the nation, which are but the legitimate results of the favorable environments of our times, all demand an increased supply of food. Natural sources are already beginning to be felt inadequate to meet the demand, and, nature being powerless to respond to the coercion, science must come to the rescue. The intelligent masses demand that they live better and longer, and the pressure for increase of quality is scarcely second to that for increase of quantity. Mankind is evolving a higher type (in which the influence of food-selection plays an important part), and refined physiological processes require refined foods. The demand for more and better foods but precedes the supply, and in the competition nature will fail and science succeed in meeting the requirements, and with the consummation will come the chemico-physiological metamorphoses towards which the evolution of food is now rapidly and inevitably tending.

It may be objected to the theory of the subversion of mastication that food can never be produced in such form as to dispense with *in-*

salivation, so essential to the digestion of many foods in the present physiological condition of man. We reply to this, as held according to our theory, that our foods are gradually approaching that condition of soft solids, semi-liquids, and liquids which will finally be presented when mastication shall have become useless; that many of our present foods are analogous to those conditions previous to the deglutition of which there is no apparent insalivation, and such foods are eminently digestible; that insalivation takes place with such foods without mastication so far as may be necessary for digestion and assimilation; and that this function of concealed insalivation can be developed to greater capacity if necessary. But as the action of saliva is required mainly for the transformation of many morphological elements (as starch), we hold that in that better day we are approaching those substances as foods will be aborted and their proximate elements (in the case of starch, as saccharine, alcohol, etc.) be employed in their purity, and digestion be reduced. The proximate elements, as albumen, casein, fibrin, olein, etc., will be used as foods alone; and mastication being dispensed with and digestion simplified, the former function will be abolished and the latter reduced. We hold that, as physiological metamorphoses have already taken place in man, it is possible for a continuance of them under reactive adaptive influences, and the law of accommodation of organization to environments. The physiological phenomena of mastication, insalivation, and digestion, are controlled and sustained or altered by the characteristics of food. The influence of food has already operated upon the function of mastication to the extent of causing its appreciable reduction, and the inevitable tendency of food to become further modified implies a continuance of the suppression of mastication until it shall be finally aborted.

To sum up our conclusion, we hold that (1) the food of man has undergone marked changes under the influence of developmental civilization, having become softer during the growth of modes of preparation; (2) that although it has not altered materially in kind, its preparation has been so elaborated as to reduce very greatly the necessity for mastication; (3) that this latter function in man is in consequence in process of suppression; (4) that this suppression is strongly evident and will be more marked in the immediate future; (5) that it will be accelerated by the chemical manufacture of foods, which latter will finally result in the production of aliments that will utterly dispense with mastication; (6) that this source of food is created by the popular demand, and for economic and æsthetic reasons; (7) that the final effect will be the abolition of mastication, which will result, through its gradual withdrawal, in the total suppression of the teeth and the accompanying phenomena that will result.

THE ELECTRO-MAGNETIC MALLET.

BY EDWIN T. DARBY, D.D.S.

(Read before the Pennsylvania State Dental Society, July 14th, 1875.)

Mr. President and Gentlemen,—Thirty-eight years ago, Dr. William H. Atkinson, then in the practice of dentistry in Cleveland, Ohio, commenced using the hand-mallet for consolidating gold in the operation of filling teeth. He does not claim to have been the first to use it, but says he got the hint of Dr. E. Merit, of Pittsburg, who used it for consolidating his filling after the gold was all in. Dr. Atkinson used it throughout the operation, condensing each piece of gold as it was introduced.

Comparatively few practitioners adopted this new process for the next twenty (20) years.

Like all things new, it had its advocates and its opponents; the first carrying its use to an apparent extreme, the other denouncing it as cruel and useless. It is within the last fifteen (15) or twenty (20) years that its use has become at all general. During that time we have been constantly oscillating between the light wooden mallet, weighing less than one ounce, and the heavy lead mallet, weighing from eight to sixteen ounces,—between the convex-faced shoemaker's hammer and the concave steel mallet of less weight. Appreciating as the profession did the value of a blow thus enabling them to impact with less physical exertion the particles of gold one with another, they have ever been seeking to devise some automatic appliance whereby they could obviate the necessity of an assistant and regulate the force spent upon each given point. In the year 1866, Drs. George B. Snow and Theo. G. Lewis, practical dentists of Buffalo, New York, invented and patented an instrument known as the "Snow and Lewis automatic plugger." It was so constructed that by pressure upon the point a strong spiral spring was compressed and the same instant a plunger liberated, giving a sharp blow to the end of the socket holding the plugger point. About the same year, Dr. Salmon, of Boston, patented a similar instrument, both of which have been and still are used by many of our most worthy operators.

On the 28th day of February, 1867, Dr. William G. A. Bonwill, then a resident of Dover, Delaware, was on a visit to Philadelphia, and while passing through the Continental Hotel his attention was arrested by the unusually loud noise produced by the telegraphic sounder of the instrument there in use. With a keen innate perception, an ingenious brain ever awake and ready to grasp anything that could be utilized in the profession of his choice, he then and there conceived the idea of a truly automatic mallet for filling teeth, and before leaving the hotel had in his mind's eye an instrument which for ingenuity of construction has no parallel in the dental world. The following morning he called upon me, and made known to me the ideas of the previous evening. I remember with vivid distinctness his enthusiasm while describing the principles upon which it should act. No sooner had he reached his home in Delaware than he commenced to put his thoughts into effect; and, although but an amateur electrician, so thoroughly was he imbued with the inspiration and so wholly absorbed in his work, that I am told he spent not only his leisure-hours by day, but robbed his body of nightly rest, that he might rapidly complete his first model. We can hardly realize the difficulties under which he labored. Away from the marts where supplies are to be had, with little or no assistance from others, he was compelled to pursue his experiments by degrees, and with such appliances as he could himself improvise. It was upwards of three years before he produced an instrument at all in keeping with his ideas. His first was a single-coil instrument, large and unwieldy, but showing conclusively that he was on a track which, with various modifications, would lead him to a degree of perfection. Dissatisfied with his first production, he abandoned the single coil, and substituted a horse-shoe magnet. In the autumn of 1871 he wrote me that he had completed his electro-magnetic mallet, and in the spring removed to Philadelphia to practice dentistry, thus availing himself of a more extended field in which to introduce to the profession his new invention. It is hardly necessary to state that an idea so novel as filling teeth by lightning was slow to be adopted, and many at that time doubted its adaptability to that purpose, and failed to recognize in it the advantages which he claimed it possessed.

He came suddenly before the profession fully conscious of the merits of his own invention, but recognized by it as a wild enthusiast; and many asked, as in ancient days, "Can there any good thing come out of Nazareth?" No sooner was his instrument in the hands of the dentists than they felt its value as a labor-saving invention; but the number who were ready to adopt it was comparatively small, and the knowledge of such an instrument had reached but few. During the summer of 1871, Dr. Bonwill was constantly making changes and improvements and preparing one for deposit in the Patent Office. In October of the same year a personal friend of mine was on a visit to Michigan, and while in Kalamazoo learned of a gentleman by the name of George F. Green who was then engaged upon an electro-magnetic mallet for filling teeth. Feeling that I, as a dentist, would be interested in this discovery, he made more careful inquiries into the matter, and was introduced to Mr. Green and shown the models upon which he was at work, as well as an instrument completed and used by one of the dentists of that place.

Returning to Philadelphia, he at once communicated to me the facts as above stated, and I in turn made them known to Dr. Bonwill, who immediately went to Washington to file his caveat and deposit his models; but to his astonishment he found that Mr. Green had preceded him by several months. His instrument had been recognized and accepted, and a patent would be forthcoming so soon as he should have paid his patent fee. Dr. Bonwill at once declared an interference upon the grounds of priority of invention. The facts and details of that interference have already been made public, and I take it for granted are familiar to most of the gentlemen present. It is but fair alike to Mr. Green and Dr. Bonwill to state that in all probability both labored independently of any knowledge of the other's ideas or purposes, as will be shown by the different results produced. It may not be a waste of time to repeat in substance what Mr. Green has said to me by letter in reference to his labors in this direction. He says that as early as the year 1856 he first experimented with electro-motors, and soon after had one of his instruments in operation in the office of Dr. Grimes, a dentist of Kalamazoo. His description of it is the following: The instrument was a hollow helix of copper wire. The mallet a bar of soft iron, $\frac{7}{16}$ of an inch in diameter by $2\frac{1}{4}$ inches long, held loosely in the copper coil. The circuit was made by the operator, who held the conducting cord in his mouth and pressing the same with his teeth. The circuit was closed by bringing the ends of the cord together. When the connection was thus made the mallet commenced delivering rapid blows upon the end of the plugger point, which was held loosely in a case at the end of the copper helix. The whole instrument was $5\frac{1}{2}$ inches long by $\frac{3}{4}$ of an inch in diameter. The dentist who used his instrument thought it worked well, but was afraid of the expense of running his battery, and also feared he should magnetize all of his dental instruments if he continued its use.

Another objection that was made to his first was, that the blows were too rapid. He was told that they wanted a swinging blow resembling that produced by a boy with a mallet. He then temporarily abandoned the first principle and experimented with a double core, and finally with a circular magnet. He describes his last as resembling a light, slim pistol, the mallet swinging through a quarter circle, or section of a circle. It appears from other statements made by Mr. Green that between the years 1856 and 1868 he temporarily abandoned his electric instruments and produced the pneumatic engine, which was quite generally used at one time by the dentists of some of the Western States. Dissatisfied with that, he resumed the electric principle, and filed his caveat, deposited his models, and was about to receive his patent at Washington when interference was declared, as above stated. When he had reached this point he had exhausted his financial resources in expenditures for tools, machinery, etc., and was obliged to accept the assistance and co-operation of Mr. Samuel S. White in order to prosecute the interference suits. The suits have been pending for several years, and, so far as I am able to judge, neither Mr. Green nor Dr. Bonwill has as yet obtained a patent.

The next electro-magnetic mallet to which your attention will be directed is one invented by Dr. Louis Jack, of Philadelphia. On the 18th day of April, 1874, Dr. Jack appeared before the Odontographic Society of Philadelphia with beautifully-executed drawings of his instrument and a working model made by Mr. Otto Fleming. After fully describing it and its manner of working, he presented the same to the association. I am not able to give a detailed description of his invention, but would simply say that it occupies less space, and is much lighter in the hand, and is considered by many a very valuable modification of the others described. Dr. Jack has been using one of them for upwards of a year, and feels that it realizes his most sanguine expectations.

Before passing from this portion of our subject I feel impelled to say, that whatever improvements or modifications have been made upon Dr. Bonwill's instrument, have been done with no spirit of jealousy or self-glory. To Dr. Bonwill belongs the honor of having first produced a practicable electro-magnetic mallet. It is true his first was not all that could be desired in an instrument of the kind; but no sooner did others strive to improve it than he, stimulated by their exertions, far surpassed them in something purely original. The result has been that the present one is superior to anything before produced, and although it may not as yet have reached that degree of perfection which it will ultimately attain, it is to-day one of the greatest blessings ever bestowed upon a weary, laboring profession, and entitles its inventor to the profoundest honor and sincerest gratitude of all who use it.

And now let us consider briefly the advantages which the electric mallet possesses over all other instruments intended for the purpose, namely, consolidating gold in the operation of filling teeth. First. It is purely automatic in its action. Its power or force is entirely distinct from anything physical or individual, except the will of the operator and the touch of his educated finger. No more physical force is required to manage it than would guide a pen or hold a pencil. The dentist may stand or sit at his chair hour after hour and feel no greater fatigue than would naturally result from restrained position or concentrated thought. One who has not used it and become thoroughly accustomed to it, can little understand the vast amount of physical force others are saving themselves by its use. It was my fortune to obtain one of the first, nearly or quite four years ago; and, although great improvements have been made upon it since, I look back upon those four years of comparatively active duty, feeling that I should at times have given way, and perhaps been obliged to abandon my practice, but for the assistance which the electric mallet has rendered me. So great is my appreciation of it, and so confident am I of its great value, that I fear were I obliged to discontinue its use I should fall far below that standard which we so justly claim should characterize the operators of the present day.

Nor is it a labor-saving instrument only: it is a time-saving invention. Seneca taught that time is the only thing of which it is a virtue to be covetous. Too lightly, as a rule, do we estimate the value of time in our operations; our field for usefulness is limited. Our course or stadium has its bounds at no distant future, and he who is most successful, who accomplishes most for himself and for those who seek his services, is he who knows *best* the value of each moment, and so systematizes his work and adds to his appliances such things as help him to expedite his operations,—never sacrificing quality for quantity, excellence for rapidity. The length of time required to thoroughly pack the gold in most cavities is lessened at least one-half by the aid of the electric mallet. I profess not to have acquired that degree of manipulative skill that enables me to fill all cavities with lightning-like rapidity, but in the great majority of instances one-eighth of an ounce of foil can be thoroughly consolidated in from sixty (60) to seventy (70) minutes. The inventor, I believe, professes to do the same in thirty or forty. You will at once recognize, gentlemen, the value of the electric mallet as a time-saving invention. Nor is it a time-saving instrument only: it is a pain-saving appliance. Our profession is pre-eminently a pain-producing one. Most of our operations are attended with more or less pain, and the duration of them renders it the more shattering to the nervous system. Since we have felt the need of the hand-mallet or automatic to consolidate our fillings, the pain has been rather increased than otherwise. Few of us feel that we could well dispense with all of the various mallets so generally in use, and yet how reluctantly do we submit to a protracted operation upon our own teeth when the hand-mallet is employed! It is true some complain when the electric mallet is used, but by careful investigation I have satisfied myself that it is more fear than pain. The instrument when in use makes more or less noise, and the sensation upon the tooth is at first peculiar, and suggests pain, if it does not actually produce it. One of the best arguments in proof of its painlessness is the fact that our patients not unfrequently go into a deep sleep and awake to find the operation nearly or quite completed. The blow produced by the electric mallet is sharp and quick, and does not jar the tooth like the hand-mallet or Snow and Lewis automatic. The operator must be skilled in its use, otherwise he may allow the mallet to strike the filling several times in the same place, whereas but one blow is needed. My own experience and observation has been that less injury to the tooth and lining membrane has followed the use of the electric mallet than formerly attended the use of the hand-mallet or even hand-pressure.

Its advantages only having thus far been enumerated, you would naturally ask, Has it no disadvantages? and, if so, what are they?

It were impossible, I take it, for finite man, whose sphere of toil and duty is "in a world where mind and matter are joined in such mysterious wedlock," to produce at once an instrument of any kind perfect in all its details, and yet the imperfections which many seem to see in this instrument are more imaginary than real. Some have objected to it because of its liability to get out of order, and, as they say, the inconvenience of having it repaired. This is equally true of a watch or a locomotive, and yet we would not think of abandoning either for that reason. A dentist of only ordinary ingenuity can take it to pieces and replace each part thereof with perfect ease, or substitute any portion that may become broken. The instrument as now made requires little or no adjusting, and with care may be used for years without the least expenditure for repairs. Others have objected to it because of the expense and trouble of running the battery. This objection is hardly worth considering. The total cost per week is not more than ten or fifteen cents, and if the battery is thoroughly cleansed once in ten days, which may take fifteen or twenty minutes' time, and can be done just as nicely by an office-boy or student, it is all that is required in that direction. I know of no better battery than a three or four-celled Bunsen with well-amalgamated zincs. They can be used for years by simply replacing a zinc which may in time become eaten, or a carbon which may have gradually dissolved. More easily managed than steam or water-power, electricity has made its way into our profession, and is daily performing for those who use it a service which entitles it to a rank among the most useful of our motors.

I do not feel that I shall transcend the limits of the subject which you have assigned me if I speak of the electro-magnetic mallet as a patent. I am not here as an advocate of dental patents. On the contrary, I could wish that our profession were free from them. Our progress, growth, and position among the noble professions depends very much upon the laws which regulate and govern our societies. If we would be thought noble, we must be generous. If we seek position, we must be worthy of it. I am aware that one of the most serious objections which has been raised against the electro-magnetic mallet is that it is a patent and its inventor a patentee. Recognizing, as I most certainly do, the perfect right which every inventor has to protect himself by patent laws, my observation, however, has been that very few who have obtained dental patents have reaped any pecuniary gain thereby.

There are circumstances under which professional men are justified in securing patents upon their inventions; where, for instance, a device is applicable to purposes foreign to that for which it is used in the professions, and this Dr. Bonwill claims for the electric mallet. It is difficult, gentlemen, to draw a line of distinction with any degree of justice unless that line cut off entirely from among us those who have in any way dabbled in dental patents. We must be consistent. It is not fair to taboo and ostracize one who has labored hard for four years and given us one of the most valuable inventions of the nineteenth century, and at the same time open our doors to receive others who have patented corundum disks and acid batteries, drop-tubes and chip-blowers. If we refuse admittance to one we must to the other. But let us look for better things. Let us trust and believe each other and work for the common interest of our profession, ever willing to accord to each member that honor and praise to which he is justly entitled; ever willing to recognize and adopt valuable improvements regardless of the source whence they come. Then will the inventor feel that his reward for time and labor is the homage and appreciation of an honorable and noble profession.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

(Concluded from page 593.)

Fourth Day—*Morning Session.*

The association was called to order at the usual time, the vice-president in the chair. After unimportant routine business, the subject of "Mechanical Dentistry" was taken up, and a report on that subject was read by Dr. Rehwinkel. We give a synopsis, as follows:

The report alluded to the apathy shown in reference to this branch of the profession, and the disposition on the part of some to separate it entirely from the operative department; a state of things which is deemed to be due to the fact that cheap bases have taken the place of gold, and to the want of fostering care on the part of societies. The disgust of the best men with this branch was deprecated, and it was inferred that ere long a formal question as to separation will be proposed, which it is to be hoped will not be hastily decided.

The committee deemed a porcelain plate the highest form of art in this department, although its use must necessarily be limited to a few experts; next to this was placed continuous gum, which is more practical. If not prepared to complete the process himself, the dentist can send it to those accustomed to the furnace, and this plan produces excellent results. That this work is not more demanded is the fault of the dentist; for any reputable practitioner has influence enough to introduce it. A combination of gold and rubber or celluloid stands next in rank, combining the advantages of each. Aluminium has not proved as useful as was hoped. Cheoplasty has never obtained popularity, and, though successfully used, does not seem likely to be *the* substitute for rubber. Watt's and Talbot's metals were spoken of as most likely to be valuable, and the method employed by the latter gives most satisfactory results. The improvements in celluloid were next spoken of, and the committee were glad to say that it has ceased to be an experiment, promising to supersede all other cheap bases. Its advantages—its beauty and lightness, and the absence of injurious effects upon the mouth—were spoken of, as well as the opportunity it afforded for using plain teeth. One member of the committee had worn a plate of celluloid for more than three years, which, though of the first material and made by a novice in the work, has stood well to this day. The steam and dry-heat methods of working were mentioned, and the last named spoken of as rapidly gaining favor, and possessing advantages, especially in regard to the welding of different pieces, and repairing.

The experiments of D. M. Lamb, of London, Canada, who has succeeded in obtaining a vulcanizable gum from milk-weed,—which it is claimed is a successful substitute for rubber,—were referred to.

The subject being open for discussion,—

Dr. Stockton said that he had been gratified at the reference to continuous gum. No work is comparable to it. Our colleges turn out young men entirely ignorant of this work. Platinum and iridium, in connection with celluloid, is stronger than gold, and makes excellent work. The dry-heat process of working celluloid makes the hardest and best work. One advantage of it is, that it does not require so close attention as the other methods; and, if necessary, it can be left for an hour or two without injury.

Dr. D. D. Smith. This subject is so kept in the background that there is little encouragement to speak upon it. Operative dentistry only seemed worthy to be discussed, and yet there are failures in that department, and patients are continually losing their teeth and being thrown upon the resources of the mechanical department. The two branches cannot be separated, at least in our day. The speaker then presented a set of teeth from one of the best operators in the country, in the construction of which every principle of mechanical dentistry had been violated, and proceeded to point out the manner in which many principles are violated by those who attempt mechanical practice. He spoke of the preparation of the mouth, arrangement of the teeth, and the manner of articulating them. If only one tooth remains in the mouth, with no antagonist, the first principle should be to extract it. The teeth should never be arranged in a horse-shoe shape, and the articulation should be such that the pressure would be equally distributed upon all the teeth.

We have fallen down and worshiped at the shrine of rubber until progress has nearly vanished. Indolence and a love of gain join hands. A few discard it; but the saddest part of it is that only the exactions of the Rubber Company seem to be taken into account in our discussions. If rubber is king, then let us bow to law; if it is the material of all others, let us claim and use it; but if not, then let us abandon it for what is better. The Philadelphia Dental College teaches continuous-gum work and metal more than any other; it ignores rubber as far as possible; we cannot, however, entirely control the matter.

Dr. Abbott said that the New York College also taught this work, and he presumes every college does so.

Dr. Atkinson is astonished at the records of the colleges, which show more rubber work than any other.

Dr. McQuillen said our demonstrators are instructed to advise patients who come to the Dispensary for artificial teeth to have them on metal plates, but we cannot compel them to do so when they demand the rubber base; nor are students disposed to do more of metal work than they can help.

Dr. Atkinson said they could compel them to deposit a case of continuous-gum work.

Dr. D. D. Smith. Every candidate for graduation in the Philadelphia Dental College is required to show me a set of teeth in the mouth on a metal base, and to present a similar set for the museum. Sets of continuous-gum work are deposited in the museum every year.

Dr. Barrett spoke in regard to the new milk-weed-rubber base. It was plain that some cheap base was required, and this seemed to be the thing, and he believed it would prove a perfect substitute for the ordinary rubber. It was an original discovery, being harder, denser, and, he believes, stronger than caoutchouc. It will not inflame, and is a poor conductor. The company only awaited financial arrangements to place it upon the market.

The subject was then passed, and the Committee on Instruments and Appliances made a report, which was accepted.

INSTRUMENTS AND APPLIANCES.

The following is the substance of the committee's report. Owing to the multiplicity of such articles, and want of time for further detail, the report merely mentioned the articles by name, and gave in some cases the points claimed by the inventors.

MOTIVE-POWERS. The Bastet magnetic and the Backus water motors were exhibited.

DENTAL ENGINES. Samuel S. White exhibited the S. S. W. engine, also an extension treadle, and an improved hand-piece for engines, the bearings being of hardened steel and far more durable than those made at first.

There were also shown Bonwill's engine, the Elliott suspension engine, Edson & Evans portable suspension engine.

ENGINE PLUGGERS. Samuel S. White exhibited Dr. Buckingham's plugger adapted to the S. S. White engine.

Bonwill's electro-magnetic plugger, Gaylord's pneumatic, and Swartley's automatic pluggers were also exhibited.

HAND PLUGGERS. Samuel S. White exhibited Dr. Corydon Palmer's complete set of plugging instruments.

Dr. Brockway's smooth-pointed set were also mentioned.

BRACKETS. Samuel S. White presented his improved bracket.

Johnston Bros. exhibited a bracket table.

CHAIRS, ETC. Samuel S. White showed an improvement on the Harris chair, by which the upper section of the back could be quickly removed, thus shortening the back sufficiently for small children; also a detachable arm for this chair, which may be taken off and replaced readily; also an improved foot-board.

G. W. Archer exhibited a chair with a compensating spring, which is wound up as the chair is lowered, and expends the accumulated force in a lifting power.

The B. D. M. Co. exhibited Dr. Hayes's new chair.

Dr. O. C. White exhibited his improved chair with spittoon and bracket.

Codman & Shurtleff exhibited Dr. Cogswell's dental cabinet, which was spoken of as compact and perfectly adapted to the purpose for which it was designed.

Johnston Bros. presented a locking device for the castors of the Morrison chair.

LATHES. Samuel S. White exhibited his new office lathes and laboratory lathes, which were very neat.

VULCANIZERS. The Ransom vulcanizer was shown as combining a vulcanizer and a celluloid packer.

S. B. Brown also exhibited a celluloid dry-heat apparatus.

G. E. Hays presented a celluloid packer which could be used in a vulcanizer.

MISCELLANEOUS. Samuel S. White exhibited—

A dentist's lamp and warm water cup, with foil heater and annealer.

Dr. Butler's instruments for inserting screws.

An improved hot-air syringe, with metal guard for the purpose of giving firm support in the palm of the hand while compressing the bulb with the fingers.

Dr. Hickman's double-lipped rubber-dam clamp.

Dr. Osmond's clamp mirror.

Bowman-Allan's clamp forceps.

Dr. Bogue's tape forceps.

Dr. Frank Abbott's improved back-action for engine.

A device invented by Dr. G. H. Cushing, for rotating disks at an angle, was highly spoken of.

Dr. Klump's porte polisher for engine.

Dr. Huey's improved screw-head mandrel, which substitutes a screw for the ordinary nut in mounting disks.

Dr. Butler's corundum points for polishing, and a bur cut like a bastard file.

Codman & Shurtleff exhibited—

A simple and cheap tape carrier, a file carrier, and a mouth mirror of improved construction.

An ether and gas inhaler, which was highly spoken of.

Johnston Bros. exhibited—

A dental factotum.

An improved gasometer for liquid or ordinary gas.

Jarvis's separators.

R. S. Williams showed a device for holding gold cylinders, a morocco case containing glass vials labeled.

Dr. Horton's rubber pouch or bib was shown, designed to protect the clothing of the patient.

The subject of "Dental Education" was then taken up, and opened by the reading of a report by Dr. Keely, the chairman of the committee.

The substance of Dr. Keely's paper is as follows:

The future of dentistry depends upon the efforts now making for the elevation of the standard of professional education. Recognition by the medical profession as a specialty, though desirable, is not indispensable. Dentistry demands a high tone of manhood, thorough discipline of the powers, and a careful and elaborate training. Many of the lights of the profession have not enjoyed such education; by effort and ability they have achieved success in spite of this, but they would have the future members of the profession thoroughly furnished. To assume to practice at the present day without better preparation than the older practitioners, argues a failure to comprehend obligations, or an indifference to them. In the practice of dentistry, the truths of science must be embodied in the processes of art; hence both investigation and adaptation are demanded. The ideal and the practical must be brought into combination. In our discussions some lay too much stress upon scientific indoctrination, and others overvalue practical skill. A system of education must be inaugurated which shall harmonize these tendencies. As to the ends to be attained, there is unanimity; but as to the methods, there are various opinions. How shall we be relieved from the dead weight which embarrasses us? Shall it be by penal enactments of the civil power, or shall the profession refuse fellowship with any but the worthy and qualified? and what tests of ability shall be prescribed? How shall the fundamental medical and other knowledge be acquired? shall medical colleges recognize the specialty, and teach it, or shall the dental college call to its aid the medical professor to supply the needed basic culture? Both these methods may be tried, but the dental colleges will, of course, be continued. A question of great importance is, whether our efforts in this direction shall be concentrated on a few, or frittered away on a multitude of starvelings that disgrace the profession, and multiply the half-taught aspirants for honors. The example of literary institutions is before us. Want of resources and competition make their honors worthless, and professional occupations are crowded with incompetents. In our branch three first-class colleges only are needed at present, and this number could be endowed, the ablest professors secured, and ample apparatus and libraries provided. If, however, we attempt to sustain a large number of schools, some will succumb to financial pressure, and leave debts and exasperated feelings behind them; and those remaining will be neither healthy nor vigorous as they might have been. This association should inaugurate an effort to accomplish this concentration.

Dr. Flagg then read a volunteer paper on the same subject.*

The subject being open for discussion,—

Prof. Shepard said that he questioned the assumptions made by the last reader (Prof. Flagg), as to his knowledge of the workings of all the colleges of the country. By his own statements it appears that he is not practically familiar with all. In Harvard College there is no subordination of the dental to the medical, or any other department. They are all on a par. They may vary in the estimation in which they are held by the community, but so far as the governing body is concerned they are equal, separate, and independent. It is proper and economical that one man should be connected with both faculties. It is our disgrace that dental colleges have not been endowed. The professors give their services, and find their own museum and apparatus. If the state or a university will furnish apparatus, it should be welcomed, and it should not be charged that we are snubbed, or tacked on to the tail of any other institution. The abbreviation D.D.S., though thirty years old, is not to be found in any dictionary, because lexicographers derive their authority from classical institutions, and not from special schools. Time will tell which system will turn out the best rounded men.

Dr. McQuillen would approach the consideration of the subject in a dispassionate manner, independent of the interests of any institution, and in favor of the broadest culture, such as is the distinguishing characteristic of an educated gentleman in any walk of life. He believed in the law of evolution as applicable to the individual man, society, professions, and institutions of learning. Fifty years ago there were only three hundred dentists in our country; many of these had failed in other occupations, and took up with this as an easy means of gaining a living. The artisan came from his trade, the blacksmith from his anvil, the carpenter from his jack-plane and saw, and with little or no preparation entered upon practice. A few only had studied medicine, and, dissatisfied with the condition of the craft, conceived the idea of elevating the standard by establishing departments of dentistry in medical colleges. How were they received? So far from welcoming them, the faculties gave the cold shoulder to the proposition. There was only one course left,—to establish institutions where dental students could receive culture, if only a partial one. When it is considered how much there is to know, it must be recognized that the most learned are only partially educated. The first dental college met with only a limited success. Its faculty, composed of medical graduates, sent representatives to the American Medical Association, and these delegates were treated as the applicants for dental departments had been: the cold shoulder was given them. The speaker then quoted from the printed transactions of the American Medical Association for 1852, in support of his statements. Notwithstanding this experience, if a better course of instruction could now be secured by connection with medical schools, he would not stand in the way. But the question is, Can that be done? In dental colleges theory and practice go hand in hand. But the same facility is not found in the medical schools, indeed, cannot be granted in the general practice of medicine and surgery; and it may be that the dental departments would be equally defective in practical instruction. Medical graduates go out to learn the art of medicine, and woe to the community where the tyro has to practice! The graduate of the dental college is to a certain degree prepared to practice.

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* This paper appeared in the October number of the DENTAL COSMOS.

Just criticisms of the defects of colleges cannot be objected to, for out of such criticisms good will come; but the innuendoes and false statements that so often appear in regard to them are as unjust as they are ungenerous. Years ago Captain Marryatt, Mrs. Trollope, and a host of other writers of the same ilk overran our country, and, returning to their home in England, wrote works in which they misrepresented and ridiculed our country, its people, government, and institutions, and predicted the speedy downfall of the young republic. Not recognizing that in a young country the efforts of man must first be directed towards securing the necessities of life, the felling of trees, the erection of homes, cultivating the land, etc., and that it is not possible for the arts, sciences, and great institutions of learning to be developed at once,—with none of that charity which is ever characteristic of a generous mind, or that broad generalization which belongs to a great one, they could only perceive and exaggerate defects, and could not recognize the possibilities of the great future which was in store for our country and its institutions. Is it surprising that this class of narrow minds should have had a representative in the dental profession, who, visiting our country, making hasty and imperfect examinations of our dental colleges, on returning to his country, in trying to write them down, only exposed his own ignorance and prejudices? We can pity this manifestation of poor, weak, human nature, and regret that, in place of trying to degrade and lower the institutions of another country, he did not rather aim to make for the institution with which he is connected a world-wide reputation by proving himself to the profession an able writer and efficient teacher. But what shall be said of an American correspondent of a foreign journal, who, not having the manhood to write over his own signature, Iago-like, in assailing the fair fame and impugning the motives of others, proves that the suspicious man may be ever justly suspected? When such men are dead and forgotten, the institutions which they have reviled will be rendering valuable service to the profession and to humanity. Communications such as the "Chronicles of the Odontologues" place the profession in America in anything but an enviable position, particularly when a British journal apologizes for republishing such articles, and accounts for the appearance of them to the defective development of our people. If the dental colleges are not what they ought to be, sweep them out of existence. If they fail to properly prepare the student for practice, then close them up. The all-important question is, not whether the student receives an education which will entitle him to recognition on the part of medical men, but whether *he is properly fitted to go forth and serve the community as a practitioner of dentistry.* If dental colleges do this, and he believed they do, they should be encouraged and supported. The best evidence of the value of dental colleges is to be found in the leading position of their graduates at home and abroad.

Dr. Atkinson. We should not dwell so much on methods as results. Foundation principles we must have, but they are of no use till they are practicalized. He prefers dentists to medical men. It is easier to define what is required of the dentist.

Dr. Abbott wishes to defend dental colleges,—the independent schools. He referred to a charge made in Canada that the quacks came from the United States, and that the degree was unworthily granted here. He said the New York College turns out as good men as any other college, and he thought the faculty would compare with any.

Dr. Flagg thought the feeling that had arisen, if allowed to continue, would split the profession. He considered that we were able to hold our own, and we should see to it that we do not go to the wall.

The subject was then passed, and that of "Dental Literature" taken up. The chairman of the committee on that subject, Dr. I. Knapp, read a report, of which we give a synopsis.

The report adverted to the fact that dental literature is creditable to a profession that scarcely a third of a century ago began to study scientific principles; before that date, or even later, a single volume was sufficient to describe all then known to the profession. The field, however, is constantly widening, and the time has come for a full discussion of many subjects from a purely dental aspect.

The report then proceeded to review at some length Salter's work on Dental Pathology and Surgery, lately published, and quoted somewhat freely from it, to illustrate the style of the author, and touched upon his theories of development of dentine. The example of the author in giving only the results of original thought and investigation, instead of a compilation, was commended. His style was stated to be simple, clear, and vigorous; a familiarity with scientific terms being manifest, though they are sparingly made use of. His descriptive powers are good, and it is scarcely possible to mistake him, the salient points alone being seized and brought out. A philosophic tone is preserved, and conclusions are stated with judicial candor. The author's views of the histology of dentine were then shown by extracts; he takes the ground that the broad, brilliant ring seen in transverse microscopical sections is an optical illusion; upon the formative pulp is arranged a series of columnar cells, from the distal extremities of which minute tubular threads project inwardly, which are gradually prolonged in the same direction, and separated by a homogeneous blastema; these being the only discovered elements in the formation of dentine. The supposed "fibrils of soft tissue" are the decalcified tubes themselves. The indurated viscid contents of the tubes might easily be mistaken for fibrils. It is deemed highly improbable that the nervous elements distributed to the dentine pierce the walls and occupy the axis of the tube.

The report then proceeded to discuss the theories of Tomes, Wedl, and other authors on the same subject, and further quoted Salter upon the subject of secondary dentine. An extract was quoted in reference to a singular case of crushing the inferior dental nerve, in extracting the dens sapientiæ, which resulted in the paralysis of the teeth, lip, and chin of the right side. The author of the report stated that a similar case had come under his own observation. The sensation had never been fully restored.

The work of Dr. Salter, who does not allow himself to be drawn into the discussion of subjects not immediately pertaining to dental pathology and surgery, and therefore says but little in reference to dentistry proper, is a valuable text-book for students, and the more advanced cannot fail to find in it both pleasure and profit.

The report then briefly alluded to the periodical literature of the profession. The readiness of the proprietors of the journals to admit a mass of undigested and often irrelevant matter was regretted, but this was considered unavoidable in view of the fact that the editors were largely engaged in other duties, and receive but a limited compensation for editorial work; they can therefore not be expected to reject articles needed to make up the numbers, or to remodel communications, or prepare original matter. Still, it was stated that fault was justly found, it is feared, with the neglect or imperfect performance of that editorial work which is needed to prevent serious misapprehension of a writer's or speaker's opinions. The journals on the whole were commended as having done a great and good work, second to no other agency. The establishment of a quarterly journal, edited by a writer of varied and profound learning, giving his whole time to the work, and aided by paid articles, would be a long step in the right direction; not interfering with the other journals, but gathering up that which is valuable now scattered through our transient literature, and affording the best minds of the profession a medium for their best thoughts.

The subject of "Pathology and Surgery" was taken up, and, there being no reports,

Dr. Atkinson said that he had gone further into the change from physiological to pathological action than any other, so far as he had read. Inflammation is the process of disease; the vaso-motor nerves keep up the functions, and if the blood is equally distributed, nutrition takes place within the capillaries. When sufficient destruction of neurine has dominion, congestion ensues, and circulation is arrested and remanded back to cell-action, and the fluids are thus changed to soft-solids. That is one termination of the deflected function; another is tuberculous deposits. These are inside the inflammatory process. Disintegration continued generates gases, and the absorption of these converts the blood-corpuscles into pus-corpuscles, which are midway between building up and tearing down. Then we get corrosion,—ichor, evidence of death, sloughing. The speaker then spoke of the treatment of fever sores, which he would treat with a solution of chloride of zinc, twenty to forty grains to the ounce, and so get union by first intention. We must know what the tissues are on which we are operating, and what they will bear. Every man's work is either worship or blasphemy. There is no such thing as sthenic disease; to talk of it is asthenic nonsense.

Dr. Taft then spoke of the treatment of diseased gums, produced by calcareous deposits on the necks of the teeth. By merely removing these deposits the trouble will not always be remedied, nor will medicaments always relieve it. Rubbing is beneficial, pressing out the contents of the capillaries, and they will soon take on a better circulation. He regarded salicylic acid as better than chloride of zinc; aromatic sulphuric acid is also useful. Depletion will be beneficial until fresh blood has taken the place of the stagnant blood.

The subject was then passed.

The Committee on Nominations made the following report as the standing committees for the ensuing year, which, on motion, was concurred in:

Dental Physiology.—J. H. McQuillen, S. W. Dennis, A. H. Brockway.

Pathology.—J. Foster Flagg, L. D. Shepard, I. Knapp.

Chemistry.—S. B. Palmer, J. S. Cassidy, L. G. Noel.

Therapeutics.—W. H. Atkinson, C. A. Brackett, C. R. Butler.

Operative Dentistry.—Frank Abbott, A. W. Harlan, H. M. Reid.

Mechanical Dentistry.—W. N. Morrison, D. D. Smith, W. C. Barrett.

Etiology.—D. C. Hawxhurst, M. H. Webb, H. L. Sage.

Dental Literature.—M. S. Dean, E. D. Gaylord, G. C. Daboll.

Dental Education.—W. H. Morgan, J. N. Crouse, M. Wells.

Prize Essays.—F. H. Rehwinkel, G. W. Keely, H. J. McKellops.

The committee appointed to prepare resolutions on the death of Dr. Hill, of Norwalk, reported the following, which, on motion, were adopted:

Whereas, This association has with sorrow learned of the death of our brother, Dr. Asa Hill, of Norwalk, Connecticut; therefore,

Resolved, That we signify in this public manner our sense of the great loss which the dental profession has sustained, and that we sincerely sympathize with his family in their loss.

Resolved, That this resolution be inserted in our minutes, and that the secretary be instructed to forward a copy of the same to the family of the deceased.

J. H. SMITH,
FRANK ABBOTT, } *Committee.*
A. W. HARLAN,

Afternoon Session.

The association met at the hour fixed, four P.M. There being no essays on the subject of "Etiology," that subject was passed and "Therapeutics" taken up.

Dr. Atkinson spoke on the subject of salicylic acid. He said that all concurred in regard to its non-corrosiveness. He dissolves in alcohol to saturation for dressing abscesses and wiping out cavities. It supersedes creasote, and does not destroy the epithelium. It is also useful for stopping hemorrhages. It is nearly inodorous, and also nearly insipid. A solution of the alcoholic tincture in water was a good disinfecting mouth-wash and deodorizer of the spittoon. It is also useful as an ingredient in dentifrices, arresting the formation of gases. There was sometimes a disposition to criticise the earnest seeker after truth. He had been enamored with different agents. He had been the first to use creasote in teeth, and had never seen evil results from it in the hands of a level-headed man; he had heard of cases, but would question the manipulation rather than the agent. He knows it is a deadly poison. His first acquaintance with it was in dyspepsia, in aqueous solution, three or four drops to the ounce, and he don't go back on it now, though he has used thymol, and now uses salicylic acid. Bad results are often from want of management; there is a great deal in manipulation, and there is such a thing as want of compatible tension between the operator and the medicine. In salicylic acid we have pretty nearly chased the active principle of creasote into a corner.

Dr. Taft said he had used salicylic acid with great success for some months, and almost every day in some new phase. In cases of chronic inflammation difficult to reduce he had found it useful. In one tooth which had been filled temporarily for eight years, and had always been accompanied with some soreness, he had cleansed the canal and filled half full with crystals of salicylic acid and the remainder with oxychloride, and the next morning it was better than for ten years, and the soreness had not since returned. He prefers a saturated solution in ether, which dissolves three times as much as water or alcohol. In roots which were exceedingly offensive there was no odor in a few days. He prizes it, and is doing with it what creasote never would accomplish. Has used it for abscesses with similar results. Its great value lies in its antiseptic properties; it decomposes offensive matter. There is no whitening of the tissues as with creasote. It is not necessary that it should be colorless to be efficient. He had used the "dental pain obtunder" with general good results, and had used it several times a day. With it he can cut without pain. Others, however, can find no benefit from it. The active principle of it is horseradish. Aconite and chloroform have a similar effect. Has not found as good results from carvacrol as some have, especially in treating abscess. If we make a pet of a thing we can make it perform tricks for us that it will not for others; and much depends on efforts which we make which are other than physical.

Dr. W. H. Allen has used the "dental pain obtunder" without any results. It makes him positively sick. He wants none of it.

Dr. Stockton said that his patients complained of the smell of it. He has found no benefit from it whatever. He had used salicylic acid successfully. He thought a great deal of the trouble with dead teeth depends upon cleansing them too thoroughly at once, and he does not try to do it.

Dr. Osmond spoke of a preparation called "king of pain," which he was informed was oil of mustard. He has found oil of peppermint very useful for sensitive dentine. In fact, he had never found anything equal to it.

Prof. Flagg has tried all the various oils, and oil of peppermint was the worst thing to make patients howl he knew of; his experience with the "dental pain obtunder" was half-way between that of Drs. Taft and Allen. It does not seem to do much good, and occasionally is exceedingly painful. One remedy will do great things for one person and will do nothing for another. Pond's Extract is a very valuable medicine. In a case of shooting of the hand so badly that it was supposed that amputation would be necessary, the extract had been dropped upon the hand for some hours, and the result was the hand was saved. He is obliged to use allopathic and homœopathic remedies, and this is a quack remedy.

Dr. Shepard said that temperament made a great difference with the use of pain obtunders. The nervous effect is often a great deal. If you tell a patient that you are going to use some wonderful thing, and use only water, it would have a great effect. They don't have such sensitive dentine in Boston; there are only a few patients, mostly young, with whom we care for any obtunder. The miasmatic influences of certain localities render dental troubles more obstinate; they also aggravate inflammation. Has found benefit from the "dental pain obtunder" in some instances.

Dr. Abbott said he was not at all pleased with the "dental pain obtunder." It often produced intense pain. In one mouth it seemed to do some good, and the same day in the same mouth it did no good; besides, it smelt badly. He is conducting some experiments, and thinks he is on the right track.

Dr. Morrison thought the knowledge of how to excavate, not taking too large chips, and with keen instruments, would succeed best. Had used thymol, etc., and thinks nothing superior to good old-fashioned creasote.

Dr. Knapp said that some agent would be a boon to those operating in miasmatic regions. The "dental pain obtunder" causes no more pain with him than any other cold substance. The teeth that are not sensitive in his region are the exception. Has found lime-water used for three or four weeks very beneficial. Is sometimes compelled to resort to blue pill, quinine, and iron before he could operate without danger of devitalizing the pulp, and he could not treat exposed pulps without so doing. We must eradicate specific poison before we can operate upon the teeth successfully.

Dr. Butler thought the electrical condition might have something to do with it, and perhaps the condition of the operator. The pain obtunder has a sickening odor, but in many cases he has found great benefit from it. Thought the coolness was the cause of the pain.

Dr. C. S. Smith had observed something like constitutional effects from the pain obtunder; it seemed to stupefy the whole system, and he thought it was a powerful drug of some kind, and should be used with caution. He had heard it suggested that it was hasheesh.

Dr. Harlan said that it was oil of mustard, camphor, aconite, and ether.

The subject was then passed.

A discussion ensued upon the subject of clinics in connection with the future meetings of the society.

Dr. Abbott moved that we have no clinics.

Dr. Atkinson moved to amend by substituting a resolution of thanks to Drs. Bonwill, Webb, Gaylord, and Klump, who had contributed so much to the interest of the meeting by their operations at the clinic. The substitute was put to vote, and carried.

The newly-elected officers were then installed; and Dr. Northrop, the incoming president, made a few appropriate remarks.

A vote of thanks to the Executive Committee and Dr. Southworth, for their efforts to make the meeting a success, was adopted, and also to the hotels for reduced rates.

Dr. Keely, chairman of the committee on the Barnum testimonial fund, made a verbal report. He said the committee had hoped to be able to close up the matter and make a final report at this session, but they had not succeeded in getting returns from all the subscriptions that had been made. They held Dr. Barnum's receipt for ten hundred and seventy dollars, and had about one hundred dollars on hand; besides which there were unpaid subscriptions to the amount of about one hundred and fifty dollars, which he believed would all be paid up. He asked for another year to finish up the matter; which, on motion, was granted.

The chair appointed as the special committee of arrangements for the next year, Drs. McQuillen, Buckingham, and Peirce.

The association then adjourned to meet in Philadelphia on the first Tuesday of August, 1876.

AMERICAN DENTAL CONVENTION.

(Concluded from page 604.)

SECOND DAY—*Evening Session.*

PROF. WINDER. Dr. Jarvis took the position that dentistry was a part of medicine because it could not exist without medicine; medical stones are at its foundation, and you cannot build a structure without a foundation. But one science can and does overlap another. By this reasoning we might claim that astronomy was a part of mathematics, because it rests upon mathematics. Zoology is not a part of medicine, but the foundation-stones of zoology are medical stones. There is an overlapping and interweaving of the sciences, and we cannot isolate ourselves.

Dr. Welchens. We are often obliged to fall back upon medical knowledge, so called, but the dental colleges supplied that want. He does not disparage education; every man ought to be as well qualified as he can be, but a medical education is not necessary. We do not feel the want of it as much as medical men feel, or ought to feel, the want of dental education. The plainest principles of dental science are untaught in the medical text-books. Medical men do not understand how to treat dental disease.

Dr. Ambler. So far as degrees are concerned, it is all in a nutshell. The question is, Does the degree of M.D. cover the necessary qualifications for the practice of dentistry? If not, it is not sufficient. He is a strong advocate for an additional degree. He would not abolish the D.D.S., but let it stand as a collegiate degree. There are those old in the profession who can pass a better examination than many graduates. It would be an insult to them to require them to attend a course of lectures, yet to them some evidence of qualification is necessary, or, at least, desirable. To meet such cases, the State of New York authorizes the conferring of the degree of M.D.S.,—Master in Dental Surgery; not to interfere with that of D.D.S., but to enable those who desire to elevate themselves to cut loose from incompetent men. There is a class of practitioners who consider themselves too old to go to college; but, in order that they may be known as qualified, will submit to an examination by a board of censors. This board in New York has rejected those whom the colleges have conferred degrees upon. One man who had been rejected had come back in a short time and exhibited his diploma.

Dr. Goble said that he must contend that dentistry is a specialty of medicine, and cannot be separated from it. You must have a knowledge of mathematics, but dentistry is not a specialty of mathematics. Mathematics and zoology do not pretend to treat diseases; dentistry does. It is no matter what degrees we have, the knowledge must be there, and we are specialists of medicine. We have graduates of medicine, and of dentistry too, who are not fit to practice. When a man is rejected by a board of censors and in two weeks flaunts his diploma in the face of the board, there is a screw loose somewhere. Is in favor of a medical education; but it need not be a thorough one, for we do not want to practice obstetrics, but we must have a knowledge of anatomy and materia medica. To be sure, no other specialty of medicine has taken the stand that we have; but if diseases of the eye were as prevalent as those of the teeth, we should see colleges and societies of that specialty.

The dental colleges have done good, but they have done a great deal of harm as well. Two years' study will not fit a man for either medicine or dentistry. The colleges ought to require a three years' course and a competent private training, and then the D.D.S. would stand for something, and not be laughed at, as it is now, by the medical profession, because so many who possess it are totally incompetent. We cannot separate medicine and dentistry and make two distinct professions of them. Dental colleges afford the facilities required, and it is only to be wished that the faculties would see that students make good use of them, or refuse them diplomas. He does not think that medical knowledge will enable one to practice dentistry, but a medical education, with a good dental training, will make good dentists.

Dr. Hunt claims to be a practical man, and thinks our profession is a practical one. He cannot reconcile the remarks of the last speaker. He says we are not a profession, and yet he speaks of us as a profession. If we are a profession, that is all we want. Shall we throw away our diplomas, and not be allowed to practice unless we are M.D.'s? Shall we be merged in the medical profession? If dentistry were a specialty of medicine, every M.D. ought to be able to attend to the practice of it. If it was true that we need only medical knowledge he would agree that we are a specialty of medicine, but that is not the case. There is an overlapping between dentistry and medicine, and there is also between dentistry and mechanics. Our calling takes something from many others; it aggregates it all and makes a special profession. We do not want a man to go out with the D.D.S. unless he is qualified, and it is the fault of the colleges that it has been done. We know it has been done. It is our duty in such cases to go to the faculty and say, "We will hold you up to the scorn of the profession." We should stop this paying the fee and obtaining the diploma. We can do it, and it is our duty. The degree is an honor if it is a reward of merit, but not otherwise.

Dr. Goble explained that he had not fully understood the question, but he still thought that dentistry was a specialty of medicine. We had been driven to establish dental colleges by the conduct of the medical colleges themselves. They had neglected to comply with our demands. We are driven to call ourselves a profession. Let us endow our colleges. Now, if they don't graduate students, they don't get any pay. This is all wrong. We all like honors, but we all know that they are rather empty without dollars.

Prof. Winder. If medicine is to cover all the healing art, we are a speciality of medicine; but that is not the medicine of to-day. Do they have knowledge of or teach dentistry in medical schools? If it is not a part of medical education how can it be a specialty of medicine? In a general sense, it is a part of the healing art.

Prof. Buckingham. No two colleges have the same curriculum nor the same text-books. Is dentistry to include everything? Medical jurisprudence is a specialty of law, but is there no difference between a lawyer and a doctor? The lawyer must have a knowledge of medicine, and the professions overlap. Dentistry and medicine are separate, but they overlap. If medicine includes all the healing art, it must include dentistry; but is it possible to teach one man all the sciences? Formerly there were philosophers who knew a little of all sciences, but that is no longer possible. There is now a division of labor even in shoemaking.

The colleges have been charged with things they never did. The charges, when traced home, will not stand. Let the men who find fault put their shoulders to the work. If the professors did as they are charged with doing, the trustees would displace them. Some of the most unpromising men to begin with have made some of the most successful dentists. We cannot examine them as to their previous education. Some of the most eminent men in the profession write letters that would shame a student in our schools. We take a student, and lecture to him and quiz him and do our best with him, and then he goes away and becomes a quack. Is the college responsible for that? Where is the medical college that produces no quacks? Some men are born quacks. One reason of this thing is because the best class of dentists don't take students; they are too busy. They pass them off to the incompetent, who teach them that the first thing to be thought of is to make as much money as possible. Then they come to the colleges, and we can't work it all out of them.

If men would come with special cases of wrong action on the part of the professors in granting diplomas to unworthy men we could trace it up, but they will not. If they came as friends it would be different, but the manner in which the thing is done shows the animus.

Go to work, gentlemen, and endow your colleges, and bring your students up to the proper standard, and you will have model colleges. The medical schools cannot teach dentistry; they are swamped now with what they have to teach. It is a regular cramming process; besides, a man will learn a great deal in the medical college that he don't want in the practice of dentistry. His learning should be that which he has the most need of. Shall we drive three-fourths of our students away by making the standard too high? Three students go into practice from private offices to one from the colleges. Do the private students get as good instruction as even the poorest colleges give? It is not correct to attribute mercenary motives to the colleges; it would not be policy for them to be governed by such motives. We wish the profession would go to the colleges and see for themselves what they are doing. The brighter the college the more a spot shows; the medical colleges are far from perfect. Let those who are innocent themselves throw the first stone. Colleges don't want any higher standard, they want endowment. The colleges are growing; nine times out of ten rising young men are graduates. If we had a second and higher degree, it would be a stimulus to young men to do well after they graduate. Men high in the profession are anxious for the diploma; they even beg for it, and write to know what is the very shortest time that they can get through. Not one in twenty either of medical men or dentists that have been fifteen years in practice can pass examination; it is impossible, occupied as they are with the pressure of business. But they are safe men to trust your teeth with if they are dentists, or your life with if they are medical men.

Dr. Reynolds. Every study that is taught in the dental college is the same as in the medical colleges; medical men who have never practiced dentistry are professors in the dental colleges. Now, why is it not a specialty?

Dr. Buckingham explained that though the course was the same, yet special attention was bestowed in the dental college upon those branches which relate to the teeth and their treatment. The dentist must have a general knowledge of medicine, but not that special knowledge which is necessary to practice.

The meeting then adjourned.

THIRD DAY—*Morning Session.*

The convention met at the usual hour, the president in the chair.

A letter from Dr. G. A. Mills, accompanied by a paper, was read by the secretary. The letter suggested the appointment of dentists in certain localities to act as "a bureau of statistics" to bring results together for the annual meetings. Dr. Ambler thought the idea a good one, but that the statement of it was not sufficiently explicit, and moved that it be recommitted to the author for further elucidation, which motion prevailed. The paper which accompanied the letter was upon the "Rise and Progress of Dentistry."

The convention then proceeded to select the place of next meeting, and fixed upon Philadelphia.

The officers for the ensuing year were elected, as follows:

President.—Prof. B. F. Coy, Baltimore.

Vice-President.—C. S. Stockton, Newark, N. J.

Recording Secretary.—Ambler Tees, Philadelphia.

Corresponding Secretary.—S. Welchens, Lancaster, Pa.

Treasurer.—J. G. Ambler, New York.

Executive Committee.—Drs. Neal, Ambler, Welchens, Townsend, and Hunt.

A recess was then taken till one o'clock P.M.

Afternoon Session.

At the afternoon session, Dr. Ambler, not having had time to prepare a new paper, read one from the printed transactions of the convention of some years since, on the subject of mineral teeth.

The subject suggested by the paper being open for discussion,—

Dr. Hunt, of Washington, asked who was responsible for the decline in the mechanical department. The manufacturers are not wholly responsible. They supply the demands which we make.

Dr. Ambler. The difficulty is that manufacturers make that which sells best. The great mass of people want pretty teeth instead of natural-looking teeth.

Dr. Goble (Hoboken) made some remarks on the subject of dental education. He said that he was a strong supporter of a dental education, and spoke of the worthlessness of the diploma to-day in the estimation of the profession. The Maryland college has taken the responsibility out of the hands of the faculty; let others do the same thing. He predicts a liberal support for this policy. If the profession sustains this movement, other colleges must follow, and then the D.D.S. will mean more than it does to-day.

Adjourned to eight P.M.

Evening Session.

At the evening session the discussion on dental education was continued.

Dr. Hunt said that the action foreshadowed by some of the colleges is that after a certain date two full courses will be required of all candidates for graduation, irrespective of all other considerations, and nothing accepted as an equivalent. The true principle is, that merit, skill, and acquirements should entitle to a diploma, without regard to time. This is the proper and true principle, and the wonder is that it was not adopted long ago; the only reason is that the medical colleges always pursued the other course, and ours have continued the same plan. This was a step backward, forcing natural laws, and founded on the incorrect principle that all must have the same length of time to be qualified. There is a great difference in mental talent, capacity, and readiness to be taught; and to compel a man to stay two years, who can in one year's time acquire sufficient knowledge to pass, is an injustice to him. Many circumstances enable young men to acquire a practical foundation before they become connected with a college. He would take a student only on condition of his taking a diploma; would make him read, and in three or four years he would acquire such an amount of knowledge that when he goes to college he will not be as long in preparing for graduation as one who is taken fresh. Thousands of students are in this condition. If the two-course plan is adopted, what will be the use of their wasting two years under these circumstances? It is only within the last ten years that the colleges have increased, and the necessity of education has been recognized by nearly all the profession. Suppose a dental association which has a provision that members shall consist only of those who have a degree; there are many old practitioners of twenty-five or thirty years' standing; they might wish to come in, but could not. They would like a degree; the college says, "You can attend two courses, and if you are qualified you can graduate." Is that just? Shall a man who has acquired the confidence of the community be obliged to take the same course as the young man? Is it not correct that when a student applies for a diploma he should have it if he proves himself qualified and competent? It is a plain proposition, and there is no argument against it.

Prof. Winder said that he claimed that the system which the Maryland Dental College was pursuing has been pursued by all the first-class institutions of the world, the medical colleges of the United States alone excepted.

Is the diploma a certificate that you have been so many hours and so many days in a college? No; it certifies that you possess a certain amount of knowledge. The whole educational system of the world is based upon that principle, with the exception of the medical schools of the United States. They do not ask you where you got your knowledge; the question is, Have you got it?

Dr. John Allen. The position which has been spoken of is the correct one. The only difficulty would seem to be in the selection of the board of regents. They must be men of a high order to stand above the professors, and there might be some difficulty in selecting such a board. If it can be done, and they will enter into it heartily, it is the best safeguard we have.

Prof. Coy. The necessities of the day require a diploma; the old practitioner wants one; he matriculates, and, in a week, if he can pass, well and good: he is sent before the regency, and if he passes he will get his diploma. He hopes that if the example that has been set by this college is right, it will be followed.

The discussion was then closed, and after some unimportant routine resolutions of thanks to the retiring officers and the Messrs. Leland, of the Ocean House, the convention at half-past ten P.M. was adjourned to meet in Philadelphia on the second Tuesday in August, 1876.

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ANNUAL MEETING OF THE DENTAL SOCIETY OF THE STATE OF MARYLAND AND DISTRICT OF COLUMBIA.

THE annual meeting of the Dental Society of the State of Maryland and District of Columbia was held in Washington, D. C., October 27th, 28th, and 29th, 1875. President, Dr. R. B. Donaldson, of Washington, in the chair.

Dr. R. Finley Hunt delivered an address of welcome.

The annual address was delivered by Dr. Donaldson.

Papers were read as follows: Dr. H. C. Thompson, "Operative Dentistry;" Dr. J. Curtiss Smithe, "Mechanical Dentistry;" Dr. B. F. Coy, "Dental Education;" Dr. H. H. Keech, "Dental Pathology;" Dr. R. B. Winder, "Deterioration of Teeth Ethnologically Considered;" Dr. W. H. Barrett, "Filling of Roots of Teeth."

Dr. Hunt, from the joint committee of the Baltimore and Washington Dental Societies, appointed with a view to inducing the United States Government, through its army and navy medical departments, to aid in collecting statistics bearing on the decay and deterioration of human teeth, informed the society that the joint committee had considered the subject and had submitted a paper to the Baltimore and Washington societies, to be presented to the surgeons-general of the army and navy, in which the objects of the movement are set forth, and the aid of the Government invoked, together with a tabular form which, in their opinion, will facilitate the collection of the statistics and information desired.

The committee also had recommended that the co-operation of the Dental Society of the State of Maryland and the District of Columbia be invited, and that the annual meeting of that society be made the occasion of presenting the matter to the Government.

Dr. Hunt stated that the report of the committee had met with the approval of the societies of the two cities, and that he now presented the subject in accordance with the recommendation of the committee.

After a short discussion of the movement, the following resolutions, presented by Dr. Hunt, were adopted:

Resolved, That this society consents to take charge of this matter submitted to them by the local societies of Baltimore and Washington.

Resolved, That a committee of six be appointed, whose duty it shall be to present to the surgeons-general of the army and navy of the United States the paper submitted this evening by the joint committee of the Baltimore and Washington City dental societies.

The president appointed a committee of six of the society, as called for by the resolutions.

Professor R. B. Winder offered a resolution, which was adopted, that a committee of three be appointed, to report at the next annual meeting, to take into consideration the expediency of forming the society into permanent sections, representing the different branches essential to scientific dentistry, and allowing each member of the society to follow his own preference in selecting the particular channel in which he will persistently labor, in order that the whole science may advance more rapidly through some systematical arrangement of this sort, and if in their opinion it is expedient to report a plan therefor.

Prof. Winder also offered a resolution, which was adopted, that a committee of six be appointed, to report at the next annual meeting, whose duty it shall be to open a correspondence with every country and people where dentistry is practiced, and to take advantage of every opportunity to collect statistical facts which can have any influence upon the development and structure of teeth. The following committee was appointed: Drs. Winder, Noble, Coy, Hunt, Duck, and Smithe.

The following were elected officers for the ensuing year:

President.—R. B. Winder.

Vice-President.—George S. Fouke.

Corresponding Secretary.—E. P. Keech.

Recording Secretary.—R. Finley Hunt.

Reporting Secretary.—J. Curtiss Smithe.

Treasurer.—B. F. Coy.

Executive Committee.—H. B. Noble, C. T. Brockett, M. W. Foster.

Adjourned to meet in Baltimore, first Wednesday in September, 1876.

CONNECTICUT VALLEY DENTAL ASSOCIATION.

The thirteenth annual session of the Connecticut Valley Dental Society was held in Springfield, Mass., October 21st and 22d. The officers elected for the ensuing year were as follows:

President.—Dr. H. F. Bishop, of Worcester, Massachusetts.

First Vice-President.—Dr. H. W. Clapp, of Westfield, Massachusetts.

Second Vice-President.—Dr. E. M. Goodrich, of Westfield, Massachusetts.

Secretary—Dr. C. T. Stockwell, of Springfield, Massachusetts.

Treasurer.—Dr. N. Morgan, of Springfield, Massachusetts.

C. T. Stockwell, *Secretary.*

CORRECTION.

Having noticed evidently inadvertent errors in the report of my remarks during the morning session of the second day at the Niagara Falls meeting of the American Dental Association, I would request that you correct them by the transposition that "*in sleep there is an anæmic condition of the brain, while in the unconsciousness of anæsthesia there is a hyperæmic condition frequently amounting to turgescence;*" also, by allowing me to state that I spoke of the irritation of the pons varolii as the *critical commencement* of a series of consecutive conditions which culminated in that abnormal action of the pneumogastric and spinal accessory, announced by true stertorous respiration, *which was next to death;* also, instead of saying that "the daughters of leading medical men are in the same condition," referring to insomnia, hysteria, etc., I merely mentioned incidentally, during the relation of *an illustrative case*, that the patient was the daughter of one of our leading medical men!

In the evening session of the third day, although correctly reported as having used the very inelegant but somewhat expressive term "bosh," I cannot, in justice to myself or to the many excellent papers and discussions of the Odontological meeting at New York, which were referred to, permit the continuance of the *impression* which would naturally be given, that I intended discourtesy towards that organization, an act which I beg leave distinctly to disavow.

The subject of the hour was "Amalgam," and many incidents of the "proceedings," which will be well remembered by those present, would be requisite to afford to others a just conception of the influences under which I spoke.

The expressed object for which I was present was the opposing of the attempt to engraft the profession of dentistry upon that of medicine; much collateral argument had been indulged in, both before and after sessions, in this direction; "advertisements," communications, and letters had been shown, referred to, and commented upon, which had excited surprise, ridicule, and contempt, and it was the deductions from amalgam experiments, and analyses of amalgam alloys from medical sources, which seemed to me such absurdities to present to practical dentists, that I had no other term to apply to them than the one I used.

J. Foster Flagg.

OBITUARY.

DR. J. A. CLARK.

At Hanover, N. H., October 2d, 1875, Dr. J. A. Clark, aged twenty-six. Dr. Clark was a graduate of the Boston Dental College, and an exemplary man in all the relations of life.

PUBLISHER'S NOTICE.

CLOSE OF THE VOLUME.

THIS issue completes the seventeenth volume of the DENTAL COSMOS.

The first number of the eighteenth volume will be published January 1st, 1876, and succeeding numbers on the first of each month following.

The circulation of the DENTAL COSMOS has steadily increased from the first volume to the present. Within the last three years its subscription list has grown beyond all precedent. We are well assured that the subscriptions for 1876 will far exceed those of any previous year, but believing that, at the price at which it is offered, no practicing dentist can make a better investment, we invite those who have not heretofore subscribed for it to send in their remittances for the eighteenth volume on trial.

We request all who desire to subscribe or to renew their subscriptions to do so promptly, that we may determine the size of the edition which will be required.

Dr. J. W. White will continue the editorship.

SAMUEL S. WHITE.

PERISCOPE.

THE DENTAL PROFESSION.—A meeting of provincial practitioners of dentistry has lately been held at Manchester to consider the question of an appeal to the Legislature for the passing of an Act to protect the rights of the dental profession.

It was resolved "that a committee be formed to see what steps can be taken to arrest the continual influx into the profession of illegitimate practitioners by the adoption of the principles of registration and compulsory education;" and "that a subscription list be opened to defray the expenses of such a committee in making an appeal to Parliament next session, if possible, on the subject."

We will not criticise the language in these resolutions, for the meaning is discernible if the grammar be questionable.

From the discussion which took place, it appears that the meeting was of opinion that the Legislature may be induced to pass an Act which shall grant to the dental profession privileges far greater than those enjoyed by any of the learned professions. The law which these gentlemen hope to place on the statute book is one rendering it penal for any unqualified person to assume the title of dentist; but in order to guard against the infliction of injustice upon any class of practitioners, it is to be provided,—

1. "That all existing dental practitioners should be registered;
2. "That no unregistered dental practitioner shall be able to recover fees; and
3. "That a date shall be fixed, after which no one shall be registered unless he possess a recognized diploma."

They appear to be unaware that such is the wording of the Medical Act of 1858 that any person may assume sham medical titles sufficiently to deceive the public, provided that he do not actually adopt one of the qualifications enumerated in the Act. He may with impunity style himself doctor, accoucheur, or practitioner of medicine. The advertisements of quack doctors are now rarely to be found in the London newspapers; but many of the provincial organs are still disgraced by whole columns of advertisements of medical quacks who assume titles which lead the public to believe that they possess a recognized diploma.

If, therefore, it became penal to adopt the title of dentist, there would be still nothing to prevent the advertising dentists from assuming the title of doctor, and advertisements stating that *Doctor* —— supplied his patent artificial teeth at 2s. 6d. apiece, or that he extracted, stopped, scaled teeth at a shilling apiece, would be not less effectual in attracting patients than if he made the same announcement under the more modest title of dentist. As a matter of fact, more than one of the notorious advertising dentists do at the present time style themselves doctor,—add M.D. to their names, and assume medical titles to delude the public into the belief that they are qualified medical practitioners.

The passing of an Act such as desired by the gentlemen present at the meeting referred to would be useless in its entirety, conferring no benefit upon the dental profession, and in no way preventing quacks from practicing dentistry; but, on the contrary, it would enable the quack dentists now in practice to announce themselves with truth legally-qualified practitioners. Surely under no circumstances can a proposal be seriously entertained which would admit such a class to a profession, giving them a license to plunder and to maltreat the public.

Again, so far as the recovery of fees is concerned, it is a matter of no importance whatever to the unqualified dentist whether he could claim fees in a court of law for professional services or not. The great bulk of his profits, as is well known, are not derived from operations, but from the artificial teeth which he supplies, and for these the law will always enable him, as it does at the present time, to recover fair charges for *goods supplied.* None would be more gratified than ourselves if the labors of the committee were to result in advancing in any way the interests of the dentists; but whilst, on the one hand, we have shown that should the Legislature grant the privileges demanded by this meeting no real benefit would accrue to the profession,—on the other hand, we do not hesitate to assert that they will not obtain complete protection such as they desire, and which has not yet been granted even to the medical profession, which deals with the lives of the people. We think that the dental profession have reason to be satisfied with the great progress they have made during late years. Their specialty has obtained full recognition as a branch of surgical practice, and the license in dental surgery granted by the College of Surgeons provides them with a distinctive qualification. All practitioners of dentistry who were in practice before 1858, and who have conducted themselves as professional men, may present themselves for examination without having passed through the prescribed curriculum; but we notice that only five out of about sixty gentlemen attending the Manchester meeting had obtained a diploma. We shall not comment upon this point, but we would remind them that the advance of the professional status of dentistry is due to the improved education of those who have taken the diploma, and we can assure the profession that their position is not likely to be further improved, nor their interests served, by legislation. Such can only be brought about by an increase in the individual worth of its members. It is to improvement of this kind, and not to protective legislation, that the medical profession owes its present position.—*Editorial in Medical Press and Circular.*

ORGANIZATION OF THE DENTAL PROFESSION.—On the 31st ult. a largely attended meeting of dentists practicing in Manchester and the surrounding towns, and including representatives of the profession from France, London, Dublin, Liverpool, Brighton, and other places, was held in Manchester for the purpose of taking steps to improve the position of the dental profession. Mr. C. J. Fox, of London, editor of the *British Journal of Dental Science*, presided, and delivered an address in which he said that the present was the first meeting that had ever taken place in Europe for the general purpose of raising the social status of the dental profession. It had become evident that, notwithstanding the establishment of societies, hospitals, schools, and diplomas, there was a gradually increasing feeling that something yet was wanting to complete the establishment of dentistry in the honorable position in the public mind which it ought to hold. Protection was required for the legitimate dentist against the men who without the least previous training were daily entering their names in the public directories as surgeon-dentists. If that evil could not be wholly done away with, it could, he thought, be lessened in a very great degree. The plan proposed was that all existing practitioners should be registered; that no one should be able to recover fees as a dentist unless he were so registered; and that after a fixed date none should be registered unless they were in the possession of a diploma. As matters stood at present, the people had no means of distinguishing between the real practitioner and the man who, without the slightest qualification, placed a brass plate upon his door and called himself a surgeon-dentist. Mr. Dennant (Brighton) moved, and Mr. D. D. Wormald (Bury) seconded, the following resolution: "That it is desirable that a committee be formed to see what steps can be taken to arrest the continued influx into the profession of illegitimate practitioners, by the adoption of the principles of registration and compulsory education." The resolution was passed, as were also resolutions requesting the chairman to take steps to secure the formation of a committee, and authorizing the opening of a subscription-list to defray the expenses of such committee in making an appeal to Parliament next session upon the subject. More than two hundred pounds was subscribed in the room to carry out the purposes of the meeting.—*Medical Times and Gazette.*

WHO SHALL CONFER DEGREES?—The New York *Medical Record* of 28th ult. has an editorial on professional education, the pith of which is contained in the following paragraph: "We believe that the foundation of all reform in medical education rests mainly upon the enforcement of the two conditions, the necessity of which we have so frequently pointed out,—viz.: a proper preliminary education, and an independent examining board. These two points are the *alpha* and *omega* of the requirements of the prospective practitioner, while the office of the medical college is merely to fill up the gap between the two."

While admitting that the colleges have some selfish interest in graduating their students, we do not see how, with human nature in its present state of improvement, the matter can be much bettered by the adoption of the autocratic system of foreign governments. If the trustees of colleges cannot be trusted with the selection of professors competent to examine candidates for a degree, who shall have the authority to appoint examiners? and *who shall examine the examiners?*

It is a well-known fact that offices of State appointment are more liable to be filled with incapables than with properly qualified persons; and common experience is that examinations conducted by State Boards are generally ridiculous farces, and that the members are usually no more unselfish than the parties complained of by the *Record.* Anything that the law can do towards elevating the standard in any of the learned professions can be better done through the colleges than in any other way. Let the duration of the course of tuition be lengthened by legal enactment if the people are dissatisfied with the present requirements. It seems to us that that is the only way to effectually secure a higher standard of education.—*Quericus, in Pharmacal Gazette.*

THE DEVELOPMENT OF THE TEETH.*—The description of the development of the teeth which is found in even the latest editions of English physiological text-books is entirely based upon the investigations of Goodsir, which were first published in the *Edinburgh Med. and Surg. Journal*, in the year 1838. Since that date the subject has been investigated by numerous physiologists, among whom may be specially mentioned Marcusen, Dursy, Kölliker, and Waldeyer, and Messrs. Robin and Magitot. These observers, aided by the advancement of microscopical science, have proved that the phenomena of dental evolution begin at a period of embryonic life much earlier than was supposed by Goodsir; and they are agreed with regard to the other main facts of the process, although considerable difference of opinion has prevailed on minor points. This difference of opinion may be accounted for when the difficulty of the subject is considered, the tediousness of preparing specimens, and the alteration which these undergo by treatment with the reagents, to which they must be submitted prior to microscopical examination. Messrs. Robin and Magitot have issued the latest monograph on the subject,—a most elaborate and minute description, entirely founded on original investigation, and there can be no doubt it is substantially accurate. The following is a summary of the work of these physiologists, of which no account, so far as I am aware, has been hitherto published in England. The accompanying diagrams are copied from Messrs. Robin and Magitot's lithographic illustrations.

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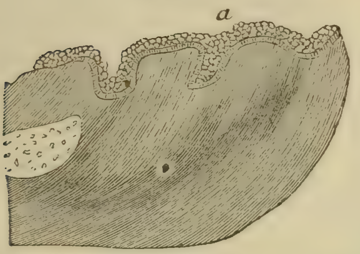
* We are indebted to the publisher of the *Medical Press and Circular* for the wood-cuts illustrating this paper, being a chapter from the forthcoming work, entitled "The Student's Guide to Dental Anatomy and Surgery," by Henry Sewill, M.R.C.S., L.D.S.—ED. DENTAL COSMOS.

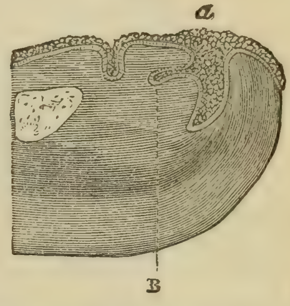
FIG. 1.



Section of the incisive region of the lower jaw of an embryo sheep, magnified eighty diameters. (The dental development in the sheep and in man are identical.)

a. Epithelial ridge or band which extends the whole length of the maxillary arch, but of which the section only is here visible. From this band the epithelial lamina will be given off later.

FIG. 2.



Section of the incisive region of the lower jaw of an embryo sheep, magnified eighty diameters.

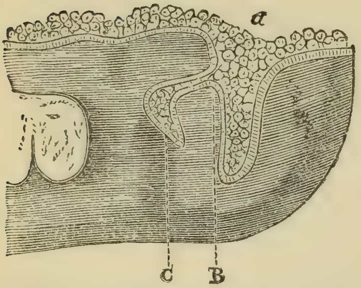
A. Epithelial ridge.

B. Epithelial lamina originating from the epithelial ridge.

The first trace of dental development in man is visible as early as the seventh week of intra-uterine life, when the embryo is not more than one inch and a quarter in length. This trace, which can be seen by the naked eye, consists of a smooth oval ridge extending along the whole length of the rudimentary alveolar border (*a*, Fig. 1). Section of this ridge shows it to be a continuous vertical band composed of a thick layer of epithelial cells, and it is, in fact, a prolongation of the epithelial layer of the mouth which has sunk into the embryonic tissue of the jaw. Before the end of the eighth week there has become developed, at about the middle of the buried or deep surface of the ridge, a projection or lamina (B, Fig. 2), which, like the layer from which it is derived, extends the whole length of the maxillary border. Its shape is a little flattened from above downwards, with its extremity rounded and curved in the form of a crook. It is composed externally of columnar cells of the deep or Malpighian layer of the mucous membrane, internally of squamous cells. Within a few more days there can be demonstrated along the border of the epithelial lamina in each jaw a series of ten small club-shaped enlargements (C, Fig. 3). These enlargements or buds are the rudimentary enamel organs of the temporary teeth, and they are situated at intervals corresponding to the position of the future teeth. They are composed of the same epithelial elements as make up the lamina, and they are destined by subsequent deposit of calcareous matter to become the external or enamel layer of the crown of the tooth. They remain for some time united to the lamina by a narrow portion in the form of a neck, which grows longer as the enamel organ increases in size. The enamel organs soon begin to assume the form of the crowns of the future teeth, but at first their shape is not well defined, and resembles a cap with the concavity directed towards the depths of the jaw.

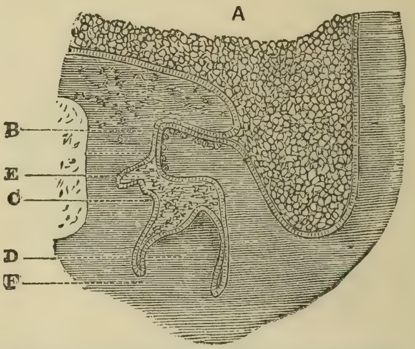
By this time (the ninth week) the first appearance of the dentinal pulp may be detected. This pulp (D, Fig. 4) eventually becomes converted by calcification into the dentine or ivory forming the bulk of the tooth. Its elements first manifest themselves in the depths of the jaw independently of the enamel organ, but directly contiguous to its deeper surface. The pulp at first consists of a small papilla composed of nucleated cells, and penetrated by a vascular loop, and it is, in fact, at this stage merely a special division of the mucous tissue unusually rich in vessels and cells. Later on, when it has assumed more definite shape, nerve-filaments can be traced into it. It grows until it impinges upon the enamel organ, which becomes moulded upon it like a cap, whilst the papilla gradually assumes the form of the crown of the future tooth. Thus, for the incisors it becomes conical, and for the molars develops outgrowths corresponding to the cusps of these teeth. By the beginning of the fourth month each rudimentary temporary tooth has become enveloped in a distinct closed sac composed of sub-epithelial connective tissue. This sac begins to appear as soon as the dentinal pulp is slightly advanced in development. An opaque fibrous outgrowth springs from each side of the base of the pulp, and grows towards the summit of the tooth, where it unites with that of the opposite side, and so forms the dental sac. By this time the connection between the enamel organ and the epithelial process from which it emanated has become severed, owing to resorption of the uniting neck or band of epithelium at the surface of the sac, and this resorption slowly progresses until the whole of the process disappears, leaving the sac completely isolated.

Fig. 3.



Section of the ramus of the lower jaw of an embryo sheep, magnified eighty diameters.
A. Buccal epithelium and epithelial ridge.
B. Epithelial lamina.
C. First appearance of the enamel organ.

Fig. 4.

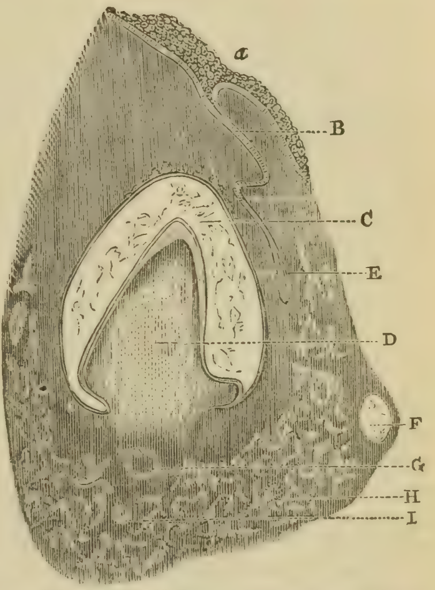


Section of the ramus of the lower jaw of an embry sheep, magnified eighty diameters.
A. Buccal epithelium.
B. Epithelial lamina.
C. Enamel organ.
D. Dentinal pulp.
E. First appearance of the enamel organ of the permanent tooth.
F. Fibrous tissue whence is derived the dental sac.

The origin of the permanent set, consisting of sixteen teeth in each jaw, has now to be described. The enamel organs of the ten teeth which replace the temporary set—namely, the incisors, canines, and bicuspids—originate from a bud for each tooth, which is given off from the elongated extremity of the epithelial lamina at its point of junction with the enamel organ of the temporary tooth (E, Figs. 4 and 5).

The enamel organ of the first permanent molar is given off from the posterior extremity of the same epithelial band as gave origin to the temporary teeth. From the epithelial process of this enamel organ a bud springs for the second permanent molar in exactly the same manner as the permanent successors of the temporary set were evolved from the epithelial processes of that set. In a precisely similar fashion the enamel organ of the third molar, or wisdom-tooth, arises from the epithelial process of the second molar.

FIG. 5.



Section of the incisive region of the ramus of the lower jaw of a human embryo. (In this preparation the epithelial cord or process whence is developed the enamel organ of the permanent tooth is seen partly isolated from its origin in the follicle of the temporary tooth.)

A. Buccal epithelium.
B. Epithelial process or cord of the temporary follicle.
C. Enamel organ.
D. Dentinal pulp covered by a small cap of dentine.
E. Epithelial cord, whence is developed the enamel organ of the permanent tooth.
F. Rudimentary cartilage of the jaw.
G. Section of the dental artery.
H. Traces of ossific matter in the jaw.
I. Section of the dental nerve.

These sixteen germs in each jaw constitute the first traces of the permanent teeth, and they each pass through the same phases of development as we have seen undergone by the germs of the temporary set, these phases being the appearance of the dentinal pulp, its junction with the enamel organ, and their inclosure in the sac. The only further difference to be noted between the development of the permanent and deciduous teeth is in the time which particular teeth take to pass through the successive stages of evolution. For example, the temporary teeth are usually all cut by the third year, whilst the first permanent molar, although its germ appears at the fifteenth week of fœtal life, is not erupted until the sixth year. Similar remarks apply to the rest of the permanent set; but it will suffice now to give the dates of the phases of their development so far as above described. The enamel organs of the incisors, canines, and bicuspids make their appearance about the sixteenth week of intra-uterine life; those of the first permanent molars about the fifteenth week; those of the second molars about the third month after birth; and those of the wisdom-teeth can be demonstrated towards the third year. The dentinal pulps of the ten first-mentioned teeth appear at the twentieth week; those of the first molars at the seventeenth week; those of the second molars about the first year after birth; and those of the wisdom-teeth towards the end of the sixth year. The complete closure of the sacs of these teeth is accomplished in the order in which they have been above mentioned at the following dates: ninth month, twentieth week, first year, and sixth year.

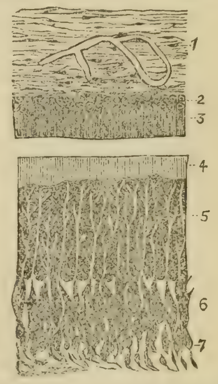
I will now describe more fully the histological changes which take place in the tooth-germ by which its elements are gradually converted into the dental tissue. This subject, like the preceding, has been investigated by many physiologists, and, like it, has given rise to considerable difference of opinion. The majority of more recent observers (Lent, Kölliker, Marcusen, Huxley, Robin, Magitot, Tomes, and Waldeyer) are, however, agreed with regard to essential points, and in the following account I have attempted to epitomize the main facts elucidated by these authorities without entering upon controverted topics.

It has been seen that the enamel organ when first formed is composed entirely of epithelial cells,—externally of the columnar, internally of the squamous variety. It retains its epithelial nature throughout the process of calcification. This process begins at the surface of the dentine, and progresses outwards. Prior to the deposition of earthy matter the columnar cells immediately in contact with the dentine increase greatly in length, and form six-sided prismatic bodies so arranged as to constitute a columnar epithelium, which, according to Waldeyer, is the most beautiful and regular found in any part of the animal body. This layer is called the internal epithelium of the enamel organ. The external cells of the enamel organ (termed external epithelium) are shorter and more cubical in form. Numerous vascular papillæ, arising from the contiguous tissue of the dental sac, penetrate to a slight depth the external epithelium, and serve doubtless to provide nutriment to the developing tissue. The cells forming the interior of the organ undergo transformation during the formation of the enamel. At first small and round, they soon become stellate in form, united with each other by their processes, and from the cells of this layer (called stratum intermedium), in contact and united with the internal epithelium, a continuous development of columnar enamel-cells proceeds.

It has been stated that the deposition of calcareous matter commences in the enamel organ at the surface of the dentine and proceeds outwards. The completed tissue results from the direct calcification of the internal epithelium. The calcification progresses from the periphery of each cell towards its center, at the same time uniting together the contiguous column. Prior to the completion of the enamel the external epithelium and remaining portion of the stratum intermedium undergo atrophy, and it is a question whether these cells ultimately disappear or take part in forming Nasmyth's membrane (cuticula dentis), the thin layer of peculiar horny tissue which envelops new-formed enamel.

Calcification of the dentinal pulp begins before that of the enamel organ. The process by which the conversion is effected closely resembles the histological formation of bone. It commences at the surface and proceeds inwards, the central portion with the vessels and nerves remaining to constitute the persistent dental pulp or "nerve" of the tooth. The dentinal pulp (as already mentioned), then, consists of a special division of the rudimentary mucous tissue, rich in vessels and cells. Its fibrous elements consist of a fine connective tissue, through which the cells are scattered. When the pulp has arrived at a certain stage of development the cells begin to be specially organized and arranged. By this time the pulp contains numerous nerve-fibrils besides blood-vessels. The latter form a plexus close to the surface. The specialized cells are termed odontoblasts. They are developed from the cells lying at the periphery, where they become arranged in a layer so as to form a kind of columnar epithelium. This layer is termed the membrana eboris. The cells are finely granular, have no membrane, and contain a large rounded nucleus. They are each provided with numerous processes, which unite them with the contiguous odontoblasts and with the subjacent developing cells. The nuclei of the odontoblasts disappear, and they become converted into a gelatinous matrix, which undergoes direct calcification, and forms the whole of the hard constituents of the dentine. The changes take place from the periphery of each cell towards the center. The central portion of each cell remains uncalcified, and forms the soft fibril which occupies the completed dentinal tube. The membrana eboris is constantly fed from the deeper layer of cells, which, united with the odontoblasts by means of their processes, form an uninterrupted series, and provide for the continuity of the dentinal tubes and fibrils. The layer of matrix immediately around the fibrils becomes converted into the dentinal sheaths—the lining walls of the tubes. It has not yet been ascertained whether the sheaths are calcified or not, since their structure cannot be examined except after maceration or incineration of the tissue.

FIG. 6 (from Waldeyer).



Longitudinal section of a milk-tooth from the fœtal sheep carried through the margin of the dentine pulp and adjoining portion of the enamel organ, magnified two hundred diameters.

1. Dental sac.
2. External epithelium of enamel organ.
3. Internal epithelium of enamel organ.
4. Young layer of enamel detached from the enamel-cells.
5. Dentine.
6. Odontoblasts.
7. Part of the dentine pulp.

By the end of the seventeenth week of intra-uterine life a cap of dentine may be demonstrated on the pulps of all the temporary teeth. By the sixth month the first permanent molar has advanced to a similar stage of development. By the first month after birth the permanent incisors and canines are advanced to the same stage; and at the third year and twelfth year respectively calcification has commenced in the second molars and wisdom-teeth.

The entire crown of each tooth is represented in soft tissue before the deposition of earthy salts commences, and as the tooth elongates by growth of the pulp from below, successive portions undergo calcification to form the root.

The development of the cement, or crusta petrosa, has not been made out beyond dispute. It probably takes place in a matrix formed by the investing fibrous coat of the dental sac. A special cement pulp has not been demonstrated in man. Cement is, in fact, a thin layer of bone, and the process of its formation is doubtless similar to intra-membranous ossification of other bones of the body.

The cuticula dentis (Nasmyth's membrane), already mentioned, is believed by some authorities to be formed from the residuum of the pulp of the enamel after the completion of that tissue. It is, however, much more probable that it is merely a thin layer of osseous tissue continuous with the cement, and having a similar origin, and analogous to the coronal cement found on the teeth of certain herbivorous animals. —*Henry Sewill, M.R.C.S., L.D.S., in Medical Press and Circular.*

THE TEETH OF THE NEXT GENERATION.—It seems scarcely sufficient for us to be contented with the efficient treatment only of dental disease as it occurs. It should rather be our aim to arrive at such knowledge as will enable us to lessen the liability of teeth to decay; in other words, that we should, by a reasonable and intelligent course of action, give such information and instruction to our patients as will tend towards the development of dental tissues more reliable in material and more perfect in organization than those that are developed in a vast number of cases in the present day.

The proposition will scarcely be denied that there is an unmistakable deterioration in the form and texture of the teeth of each successive generation; and in those cases where parents, children, and grandchildren have come under our care, it is quite easy to observe the gradual departure from the normal development of the teeth and jaws.

Patients constantly ask, "How is it my teeth are so bad, and decay and break off so readily? I remember my grandfather, when he died at seventy, had not lost a single tooth." Others, again, will tell us that their own parents died at a ripe old age with their dental organs perfect. Arguing, then, from the facts that we have ample opportunity of verifying, we cannot but conclude that the next generation will have much worse teeth than the present generation; and it seems to me scarcely beyond the limits of useful discussion if we consider what steps we can take as a body of dental practitioners in order to counteract the tide of decadence which seems to manifest itself most markedly in the teeth.

1. We have to notice that a very frequent form of deterioration is what is known as honeycombed teeth. This variety I desire to draw attention to now, because it frequently occurs that we have here the best indication as to—where it is—that treatment would be most likely to prove beneficial. For we observe that the portion of the tooth which was earliest calcified is that which has suffered most; and further, that those teeth which were developed earliest suffer more than those which were developed later; thus, for example, we may get honeycombed centrals and laterals and perfect bicuspids. This, it will be at once seen, is a most common occurrence. Then, again, we have teeth perfect in outline, but imperfect in organization. The earthy constituents do not bear a proper relative proportion to the animal constituents, or, if they do, they are imperfectly combined, or, yet again, the various parts of which the tooth is made up during the developmental stage may not be united to each other, so that they may form at last a perfect whole. Examples of this latter departure from normal dentition we have in the carious fissures resulting from imperfect fusion of the separate cusps of bicuspids and molars, as well as in those teeth where the enamel first cracks, and then flakes off from the surface of the dentine, leaving that tissue exposed.

2. We find that these conditions are not (at any rate, in England) confined to any one class or locality, or at least the boundary lines both of class and locality are not so clearly defined as to be reliable for the purpose of argument. But in Scotland and Ireland the reverse is the case: there we find those who live in cities and have accepted to the fullest extent the doubtful blessing of high civilization are the people who give the most marked symptoms of deterioration of the dental organs; whilst those who live in the country and on the coast of Ireland and Scotland have as a rule well-developed jaws and perfect teeth. The care they take of their teeth does not enter into the case as a factor of sufficient value to be worth considering (though it might apply to some of the Orientals).

3. We observe, too, that simplicity of diet in the north of Scotland, and in most parts of Ireland (except in cities), is the rule and not the

exception; and, moreover, that in Scotland especially, oatmeal in some form or other enters very largely into the diet of the masses of the people; and so strongly marked is the influence exercised upon the bones and teeth of those who eat oatmeal, that in various isolated districts and families in England its effects can be clearly recognized.

4. (*a*) It thus seems that we have a certain article of diet—or perhaps it would be wiser to say a certain form of a class of food—that when taken for one or two generations is found in its influence to be associated with well-developed teeth and bones. (*b*) That where it is not used we have inferior teeth and bones and greater liability to caries. (*c*) That the use of oatmeal and other whole meal is beneficial, even in individual cases, when adopted in early life, independently of either locality or nationality.

5. Having thus endeavored to establish the fact of the influence of whole-meal diet upon the dental tissues, both by positive and negative evidence,—evidence, moreover, which is capable of most ample proof or denial if it be inaccurate,—it only remains for me to point out the measures that I think should be adopted with a view to improving "the teeth of the next generation." The benefit to be derived from the use of whole meal after birth is comparatively small, since those teeth that are ready for eruption are in an advanced stage of development, and calcification has proceeded to a great extent with the rest; and, although we may recognize the influence of the circulation upon every part of the organism, it is not clear that in the case of the dental tissues we can hope at all perfectly to build up structures of such a dense character that have been in the first instance imperfectly developed. We are therefore by force of circumstances compelled to rest our hopes upon a dietary treatment to be adopted by the mother during child-bearing; and I cannot but think we shall be wanting in our duty to our patients if we fail to point out either directly or through our medical friends the importance of ordering such diet during pregnancy as shall supply the mother with the necessary earthy salts for the osseous system of her offspring. The use of whole-meal bread instead of flour, deprived as flour is of so many of its valuable ingredients, offers a simple way of accomplishing the end in view; whilst oat-cakes and oatmeal-porridge offer an alternative diet for those who prefer the meal in the latter forms. We might thus, I think, do more to prevent decay of the teeth than we can ever hope to accomplish by any of the prophylactic measures that can only be adopted after birth.—*Oakley Coles, L.D.S., before Odonto-Chirurgical Society, in British Journal of Dental Science.*

Mercurial Teeth.—At a meeting of the Pathological Society of London, March 2d,* Mr. Jonathan Hutchinson spoke of the frequent association of imperfectly-developed enamel on the permanent incisors, canines, and first molars, with zonular cataract; though this defect often occurs independently without cataract. "It is highly probable that the defects in the development of the teeth are usually due to the influence of mercury exhibited in infancy, although it is quite possible that other influences, attended perhaps by inflammation of the gums, may occasionally produce similar results." He refers to the opinion of Arlt, and adopts it, that zonular cataract is probably directly connected with convulsions in infancy; then returns to mercury as the cause of the defective teeth, but thinks the cataract is not caused by mercury, for "the great frequency of mercurial teeth without lamellar cataract, the not very infrequent occurrence of lamellar cataracts without mercurial teeth, are opposed to such a view." He thinks the coexistence of the cataract and defective teeth is explained by "the frequency with which mercury is given for the treatment of convulsions in infancy."

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* Medical Times and Gazette, March 27th, 1875.

In the discussion which followed, a difference in opinion was shown to exist; yet the opinion of Mr. Hutchinson in regard to "mercurial teeth" was only feebly opposed. His reasoning seems very defective. If, as he says, it is exceptional to meet with lamellar cataract without defective teeth, the first impression would be that they had a common cause; but later he says that it is "not very infrequent" to find lamellar cataract without "mercurial teeth," thus partially contradicting himself. As in his next conclusion he seems to depend upon the frequent exhibition of mercury in convulsions to explain the association of the two defects, why does he not from that conclude also that the cataract is due to mercury? for he thinks there is probably a direct connection between the convulsions and the development of the cataract, therefore mercury must have been given in as many cases of cataract without defective teeth as in cases where defective teeth exist alone. The conclusion at which he arrives that the defective teeth are "mercurial teeth" seems to rest upon assumption only; then having assumed this he argues from it as an established fact. While not wishing to assume the opposite view, I do wish to show that Mr. Hutchinson has not proved his position, but that the conclusions given in the Society's reports would rather favor the inference that both defects are dependent upon disturbance of nervous influence.

In support of this I may refer to a child who during infancy had a very slight attack of infantile paralysis, had also three attacks of convulsions, whose upper and lower front incisors of the permanent set are without enamel. She has never had mercury, to my certain knowledge, and there has been no "inflammation of the gums."—*S. G. Webber, in Boston Med. and Surg. Journal.*

ARE WE JUSTIFIED IN LEAVING DEAD TEETH IN THE MOUTHS OF CHILDREN?—I have never seen this subject discussed to my satisfaction in any of the works devoted to dental literature. It is true that most of us have been taught by our pastors and masters, that to allow a child to keep in its mouth a pulpless six-year-old is little less than a crime, however well the tooth and root may be treated and filled, and that to spare the forceps is to spoil the child; but then we do not always hearken as we should unto the words of the ancients, and I therefore trust I may be excused if I endeavor to reopen a discussion on this point, and thus discover whether this tacitly acknowledged law should be, yes or no, as binding as those of the Medes and Persians. However, before I venture further on the discussion of this theme, I will beg the readers of the journal to remember that I do not come forward as an enthusiastic advocate of the more conservative theory; I only wish to prove that under some circumstances it is justifiable and prudent practice to leave pulpless teeth in the mouths of young people.

I do not pretend to solve the great problem which consists in drawing the line and deciding clearly which teeth are to be retained and which are to be extracted: although I have studied the subject closely for years past, and have had many opportunities of doing so (being attached to several of the leading convents and schools in this city), I am very far from having come to a settled opinion on this most interesting question.

Children are now brought to the dentist at a very early age, often before they are two years old. The family physician and the parents themselves are beginning to appreciate the services which the milk-teeth render, and the time is long past when filling decayed deciduous teeth was looked upon as an unnecessary and uncalled for operation. Why should we not push the conservative principles further, and treat and fill the milk-teeth the nerves of which have died? I have performed this operation often with success, cleaning out the pulp-canals carefully, filling them with cotton and creasote, and stopping the cavity in the usual manner. Many of the readers of this journal have doubtless done the same, and it would be most interesting to hear from them what results they have obtained. Let us now consider the second teeth of children under fifteen. There are several very important reasons why these teeth should be removed when the pulp-chamber has been invaded by disease:—

1st. A pulpless tooth, possessing but little vitality, has less chance of resisting the acids of the mouth and other deleterious influences.

2d. If we remove a second tooth for a child under fifteen, the other teeth close up, and the removal of the decayed organ does not cause a gap.

3d. The extraction of a tooth sometimes relieves the crowded state of the mouth.

4th. Pulpless teeth, however skillfully filled, have a certain lack of brilliancy, a "dead" look, which sometimes makes them unsightly.

5th. The treatment of a dead tooth and its subsequent filling is a necessarily tedious and expensive operation, and this also has some weight in the minds of parents.

6th. Many of the roots of these teeth are not at that age completely formed, the apicial foramen is large and patulous, and there is a danger of forcing through it into the alveolus pieces of gold-foil or any other substance we may use for filling the roots.

Having carefully considered these and the many other objections which may be urged against filling dead teeth for young people, I still think that in many instances we do wisely and justly in resorting to this mode of treatment. Take the upper centrals as an instance. I think it far preferable for a child to have a pulpless front tooth, than for it to lose that organ and have the remaining central and the lateral adjoining it brought together, a most unsightly result; and yet the system is advocated by many dentists of the present day.* Nay! even more if the crown be so decayed that there is no hope of saving it, I think it good practice to fill the root, and reserve it for pivoting.† The same argument may be urged in favor of saving the upper laterals. I dare not plead for the lower central and lateral incisors when they are in this condition; for when one of these teeth is removed, the others may be made to close up in such a way that the lost member is not missed. Few would be found to advocate the removal of pulpless upper and lower canines, the extraction of one of these teeth involving the loss of a great deal of the symmetry of the face, so let us at once pass on to the bicuspids and molars. I know that some authorities maintain that the extraction of one of these teeth is a positive advantage to the mouth, relieving the crowded state of the teeth, etc. I may answer to this that the crowded state of the teeth is often caused by a contracted arch; why not expand that by mechanical means, and not make the poor pulpless teeth suffer when they are not in fault? Let us bear in mind that in many instances a pulpless six-year-old turns out a more serviceable tooth than the dens sapientiæ. I have daily proofs of the truth of this assertion of mine, and may cite an instance which came under my observation yesterday:

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* An American lady, verging on forty, showed me yesterday a left upper central, the pulp of which was destroyed when she was thirteen years old. The tooth is in a perfect state of preservation, and the color is barely a tinge bluer than that of the other teeth.

† I have a little patient aged twelve, now under treatment. He came to me

Some years ago, a boy was brought to me, a little "*enfant gâte*"—a lad who when his lessons were over would prefer shopping with his mother to any healthy boyish exercise—one of those effeminate bonbons-sucking young worthies, a fair specimen of a class of which my readers may possess a few examples. This boy had a very badly decayed upper molar, a mere shell; the pulp was dead and an abscess existed. He would not hear of extraction, so I treated and filled the roots and cavity in the usual way. That boy has now become a man, a "*petit crevê*" in full bloom; his teeth, owing to his mode of life, having decayed one by one, his mouth is a perfect gold mine. Alone that poor despised six-year-old has resisted the attacks of disease; it stands there a trusty servant, ready to do many another good day's work. I could cite several other cases, but for what purpose? My readers have seen countless instances in their own practice. My object in writing this paper is not to give information, but, by raising discussion, to receive it. I will only say that when the fate of a poor pulpless tooth is in the balance, if we err at all, let us err on the side of mercy. When we propose extraction as the more rapid method of curing the evil, and our little patient looks up at us and says in an imploring tone, "Oh, doctor! please don't take out my tooth," if there be a chance of saving that organ, I think the better and the kinder plan is to please the child and not take out his tooth.*—*Mordaunt Stevens, M.R.C.S.E., etc., in Monthly Review of Dental Surgery.*

CELLULOID COOKER.—I would advise no one who *has* an alcohol steam apparatus to exchange it for one of *dry* heat. If one knows how to use the former, it is very good, and perhaps as good as any other at present invented.

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with the crowns of several of his front teeth broken down by decay quite up to the gum; I am treating the roots and will preserve them for pivoting.

* One of my patients, a little girl, came to me with a dead upper bicuspid. The child was very little for her age, about eleven, but most anxious to have her tooth saved. I cleaned out the roots; the foramen was so large that I could pass a broach through into the alveolus. I filled the roots with cotton and osteo-plastic, carrying the pledget up to the end of the fang, taking care by measuring not to go farther—the cavity was subsequently filled, and the tooth has always done well since.

Use alcohol in the cup,—two-thirds full,—screw the cover down *without* the plunger; afterwards put in the plunger without turning it down, for fear of breaking the plaster. Light the alcohol, and when the steam begins to escape freely around the plunger, give the latter one or two turns, merely to fasten it in. In twenty minutes, by the clock, give the plunger two turns down, and in the next five or ten minutes turn it down home. The celluloid will *run* more freely than rubber, if you will let it get soft enough; and it takes twenty-five minutes to accomplish this under steam pressure. If some steam has escaped it may take five more. In this careful way there will be no casts broken. Be sure to have *enough* material; the surplus will find its way out of the flasks without trouble. If gas is used instead of alcohol, you will have to regulate by steam pressure; but do not begin to turn down until the steam issues with force, when you raise the escape-valve; and you do not want to turn down *home* until the steam escapes voluntarily.—*Editorial in Missouri Dental Journal.*

DENTISTRY IN 1796.—American dentists of the present day may with justice lay claim to a high reputation for skill and ingenuity. The autograph letter of Washington which appeared in the *Journal* of June 17th showed that considerable enterprise was shown also by our dental forefathers. We have before us an interesting document which gives quite accurately the degree of proficiency which had been reached in dentistry towards the close of the last century. It consists of an advertisement issued by one Josiah Flagg, surgeon dentist, who

"Informs the public, that he practises in all the branches with improvements, [i. e.] Transplants both live and dead Teeth with great conveniency, and gives less pain than heretofore practised in Europe or America: . . . Sews up Hare Lips: . . . Cures Ulcers: . . . Extracts Teeth and stumps, or roots with Ease: . . . Reinstates Teeth and gums, that are much depreciated by nature, carelessness, acids, or corroding medicine; . . . Fastens those Teeth that are loose (unless wasted at the roots); regulates Teeth from their first cutting to prevent feavers and pain in children; assists nature in the extension of the jaws, for the beautiful arrangement of the second Sett, and preserves them in their natural whiteness entirely free from all scorbutic complaints. And when thus put in order and his directions followed (which are simple) he engages that the further care of a *Dentist* will be wholly unnecessary; . . . Eases pain in teeth without drawing; . . . Stops bleeding in the gums, jaws, or arteries; . . . Lines and plumbs Teeth with virgin Gold, Foil, or Leads; . . . Fixes *gold Roofs and Palates*, and artificial Teeth of any quality, without injury to and independent of the natural ones, greatly assisting the pronunciation and the swallow when injured by natural or other defects. A room for the practice with every accommodation at his house, where may be had Dentifices, Tinctures, Teeth and Gum Brushes, Mastics, &c., warranted approved and adapted to the various ages and circumstances; . . . also Chew-sticks, particularly useful in cleansing the fore Teeth and preserving a natural and beautiful whiteness; which Medicine and Chew-sticks are to be sold wholesale and retail, that they may be more extensively usefull.

"⁂ Dr. Flagg has a method to furnish those Ladies and gentlemen or children with Artificial Teeth, Gold Gums, Roofs, or Palates, that are at a distance and cannot attend him personally.

Cash Given
for Handsome and Healthy Live Teeth
at No. 47, Newbury-Street, Boston (1796)."

The document is ornamented in one corner by formidable and antiquated instruments, while in the other are to be seen tooth-brushes quite of the modern pattern. It has been preserved by a descendant of one who, as may be seen on the back, purchased a brush and tincture from Josiah Flagg in the year 1800.—*Boston Medical and Surgical Journal.*

HINTS AND QUERIES.

PLEASE inform David Marshall, in reply to his query in November DENTAL COSMOS, that the cause of the dark line in his celluloid plates, near the air-chamber, is that it is not sufficiently softened by heat; or in other words, he commences too soon to screw down the plate. If he will wait, say fifteen or twenty minutes, according to the amount of heat, until the plate is thoroughly softened, he will have no more trouble with dark lines.

If the plate is screwed down too soon, it causes it to lap near the air-chamber,—that being the thinnest part of the plate.

I would suggest that if the manufacturers of celluloid plates would make them thicker in the center they would work much better.—WILLIAM H. DIBBLE.

REPLY TO DAVID MARSHALL'S QUERY IN NOVEMBER DENTAL COSMOS.—The dark line or fissure on the lingual side of celluloid plates, nearly opposite the air-chamber, is caused by the base plate of wax or gutta-percha being too thick, allowing the celluloid plates to double or fold. It is obviated by making the base plate thinner; or when dry heat, which is much the best, is used, by washing the plate before placing in the flask with spirits of camphor. If it does fold, then it will unite so as not to show.—J. M. BAILEY, *Woonsocket, R. I.*

WILL C. D. S., who so kindly instructs us (DENTAL COSMOS, page 110) how to mend rubber dam by a cement made by dissolving rubber in benzine, please inform us now how he proceeds to form a solution of rubber and benzine?—C. B. M.

THE PENNSYLVANIA BILL TO REGULATE THE PRACTICE OF DENTISTRY.—Please allow a country dentist to say a few words through your columns.

I see in October number of your journal a proposed bill to regulate the practice of dentistry in this State. The bill is all right so far as it goes, but we country dentists need something more. We have men traveling through our section calling themselves Doctors of Dental Surgery, from other States, who have not the least respect for the profession here or the profession in general.

Such men have done more to degrade our profession than the poor, uneducated mechanical dentist who is talked about so much.

Would it not be right to have them pay a license in our State of, say fifty dollars per year?

This would in no way affect our city brethren, or prevent a resident of our State from practicing where he pleases in the State.—J. R. W.

Third Dentition.—Noticing in the October number of the Dental Cosmos a description of a case of second dentition, calls to mind two cases which have come under my notice. The first, a young lady of twenty, for whom I extracted the superior centrals, laterals, and canines, substituting an artificial denture after several weeks, which was worn six months without difficulty, till becoming ill fitting I examined her mouth, and found a tooth had erupted its cusp nearly on the mesial line, and half an inch back from the alveolar ridge; extracted and found it a perfectly-formed and full-sized canine.

The second case, now under my observation, is a gentleman of thirty-five, for whom I extracted superior centrals, laterals, canines, and bicuspids eighteen months ago, replacing in a few weeks with an artificial denture on celluloid, which he is now wearing, but with difficulty; for calling my attention a month since to an "old stump," as he expressed it, I found the thickened but otherwise well-formed edge of a left central incisor erupting nearly in its correct position in the alveolus. I have not extracted it. Both of these are clearly cases of third dentition.—W. E. S.

Replantation.—The first case of replantation in my practice I did in March last. A gentleman was very anxious to save a right superior lateral incisor, and I recommended its extraction and replantation. He readily agreed, and the work was done; but not having much experience in tying teeth to hold them in position, I failed to keep it firmly in place, and the result was that it never became firm, although it was very comfortable. Case second was a young lady: a right superior lateral. I secured it thoroughly, and in four weeks took off the thread and it was as firm as any tooth in her mouth. I have performed the operation in twenty-five or thirty cases since, all of which were perfectly successful; two of them were lower bicuspids, and five lower molars. One case is a little remarkable, and I will give a description of it. The patient was a young man. His right superior central incisor had been abscessed for eight years, and he had concluded to have it extracted and a tooth put in on a plate. After extracting it I found that about half of the root had been absorbed, a ragged thin piece on one side indicating its full length. It seemed to be a desperate case to replant, but I concluded to try it. I took off about one-fourth of an inch, making the end smooth and blunt. After filling it with gold and polishing the root, I returned it to the socket and tied it securely to the adjacent teeth, and gave him instructions not to touch it with his fingers nor try to use it for at least six weeks. At the end of that time he took the thread off, and it was firm and useful, and has given him no trouble since. This was done on the 9th of May last.

I attempted to use porcelain teeth in twelve cases, but they all failed. After remaining in the socket for four weeks, the thread was taken off, and they dropped out as though they had been oiled, and the sockets closed up as readily as if they had been natural teeth.

Upon examination of the sockets, I could clearly see that they had absorbed more rapidly than usual.—W. H. Marshall.

Acid Secretions.—I was pleased with the remarks of Dr. Truman before the New York Odontological Society, as reported in the Dental Cosmos for August, and find myself fully in accord with his views in regard to the injurious effects of acid secretions upon the teeth. I have no doubt that the presence of acid in even a small degree is oftener than we suspect the cause of decay. Our first object should be, therefore, to change the condition into one of alkalinity where this state of things exists.

A lady thirty-three years of age, of nervous temperament, consulted me about six months ago, complaining of pain in all of her teeth. I made a thorough examination, and found the left inferior second molar decayed. Otherwise the mouth appeared healthy; the teeth being well developed and free from disease. She informed me that she had applied to a dentist before coming to me, and that he had made an application of carbolic acid on wool, which seemed to increase the pain. I found the pulp exposed and inflamed. I applied potass. bicarb., and filled with Hill's stopping, painting the gum with iodine and aconite. The next day she called again, still complaining of pain in all of her teeth. I found the fluids of the mouth acid, and prescribed—

℞.—Potass. bicarb., ʒii;
Spt. ammon. aromat., fʒii;
Ether. chlor., ♏lxxx;
Inf. gentian. comp., f℥viii.

M.—Two tablespoonfuls three times daily.

She returned in a few days to say that the pain had entirely ceased. I have since filled the tooth with gold, and everything is satisfactory.

In recession of the gums, I have prescribed the following with marked success:

℞.—Potass. iodid., ʒi;
Tinct. cardam. comp., f℥ss;
Aquæ, ad. f℥vi.

M.—Teaspoonful three times daily.

Bernard has shown that various salts after their introduction directly or indirectly into the blood rapidly make their appearance in the saliva. This is particularly the case with iodide of potassium. Its therapeutic value as an alterative in such cases is, in my opinion, not excelled. Constitutional treatment is essential to arrest the progress of the mischief.—J. J. Wedgewood, D.D.S., *London, England.*

The Steam Celluloid Apparatus.—This heater, as advertised by the Celluloid Manufacturing Company of Newark, New Jersey, and for sale at the depots of S. S. White, is by far the best of all the apparatus with which I have had to do. There certainly cannot be anything better than that. I write this for the benefit of the inexperienced in the use of celluloid. I would not of course injure the sale of any reliable machine, but give the preference to the above apparatus for the following reasons:

1st. It is a strong machine. Whoever works celluloid as it should be worked, will soon conclude that a strong machine is needed.

2d. It has no thermometer. This may seem to be a disadvantage at first thought, but after six months' constant using it with and without a thermometer we have taken off the scale and tube, and have better work and better results by using the weights of the safety-valve as our guide, and the alcohol cup as to amount and continuance of flame, than when we used the thermometer.

3d. It heats by steam. In no other way have we had as splendid results as with steam to soften and give immediate, increasing, powerfully-maintained pressure upon the flask until perfectly cool. Celluloid has a character. It must be learned, controlled, maintained.

4th. In thirty-four cases, thus made, not an artificial tooth has been broken, nor a failure to fit the mouth been the result, though the screw was applied with the might of two hands which can easily lift two hundred pounds; but the power was applied at the right time and in the right way.—J. H. Paine, *Middletown, Ohio.*